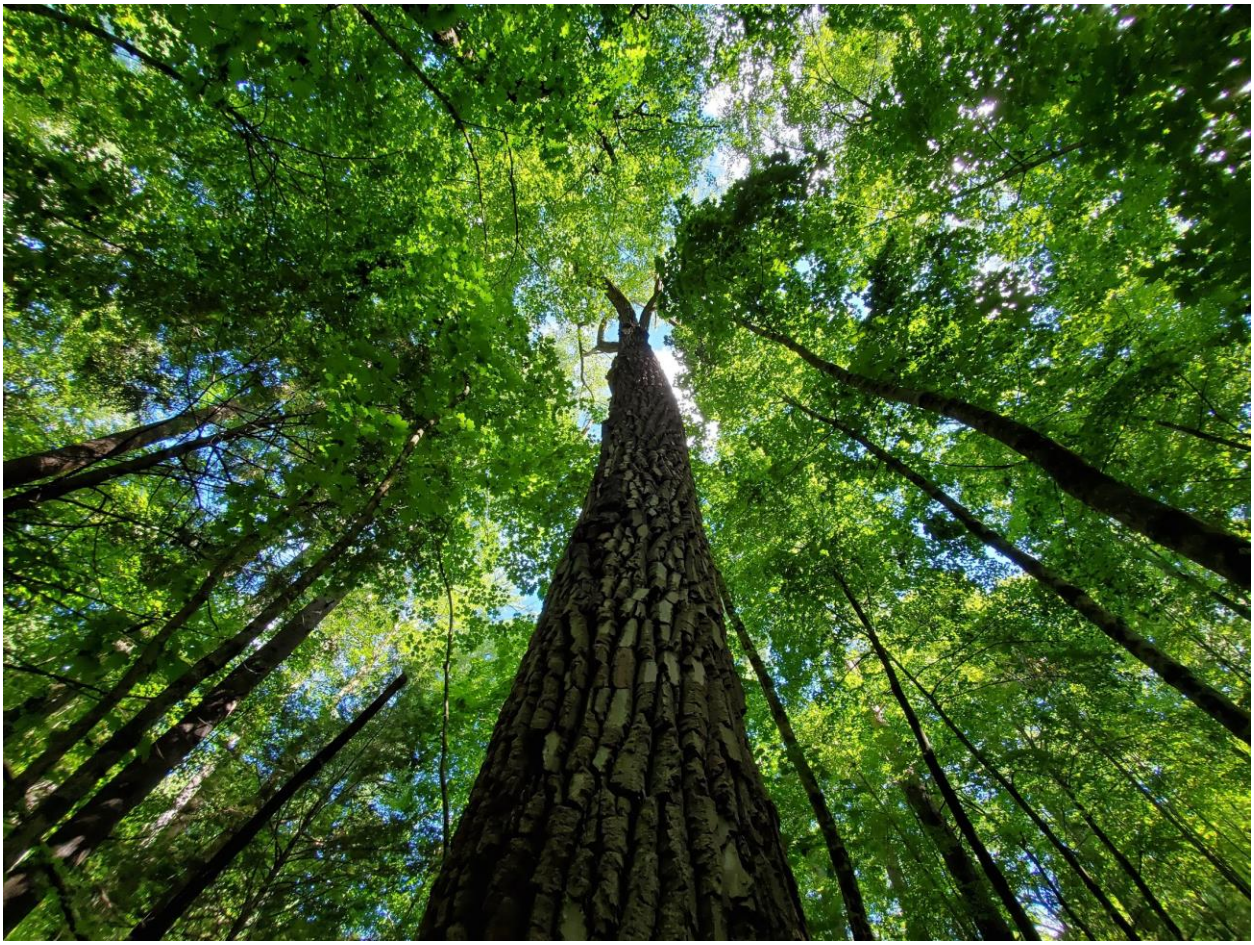
Greenfield Open Space and Recreation Plan

2021 – 2028



PUBLIC REVIEW DRAFT

Prepared by the Greenfield Open Space Planning Committee
with assistance from the
Franklin Regional Council of Governments

This project was funded by the City of Greenfield and a District Local Technical Assistance Grant provided by the Massachusetts Department of Housing and Community Development to the Franklin Regional Council of Governments

CITY OF GREENFIELD
OPEN SPACE AND RECREATION PLAN

2021 – 2028

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SECTION 1

PLAN SUMMARY

The Greenfield Open Space and Recreation Plan (OSRP) focuses the interest and motivation of community members towards the maintenance and promotion of existing recreational resources and the identification and protection of Greenfield's natural, recreational, and historical resources. The OSRP acknowledges the balance between conservation and economic development, and how these work together to promote the long-term vitality of the City. The OSRP's purpose is to provide a framework for decisions dealing with land uses that may impact valuable natural resources and the lands that contain unique historical, recreational, scenic, and wildlife habitat values.

The 2021 Greenfield Open Space and Recreation Plan (OSRP) represents the high regard Greenfield residents have for their forests, rivers, wetlands, agricultural fields, scenic views, and significant historical structures and landscapes, all of which contribute to the City's distinct character. The OSRP illustrates the roles of open spaces in Greenfield: public recreational amenities provide safe spaces to recreate, and undeveloped areas provide wildlife habitat and ensure that residents have access to forests and fields to walk, hike, and view nature.

The Seven-Year Action Plan (Section 9) gives concrete substance to the goals and objectives that were developed from the results of the Open Space and Recreation Survey and from committee members' understanding of and input regarding their City's natural resource base. Within the overarching goal of strengthening resiliency to climate change, the 2021 Greenfield Open Space and Recreation Plan prioritizes actions that will:

- Preserve, protect, and enhance Greenfield's open spaces
- Increase municipal & public awareness, understanding, and enjoyment of Greenfield's open space and recreational facilities and programs
- Prioritize climate resiliency in open space and recreational strategies to support the health of the City's people, natural resources, and infrastructure
- Develop, improve, and promote open space connections

SECTION 2

STATEMENT OF PURPOSE

The purpose of this plan is to provide an accurate and thorough basis for decision-making involving the current and future open space and recreation needs of the residents of Greenfield. This plan brings together and builds upon several of the City's recent planning efforts, including the 2014 Sustainable Master Plan, 2020 Hazard Mitigation Plan and 2021 Municipal Vulnerability Preparedness Plan. This 2021 OSRP update primarily builds on the most recent OSRP, which was completed in 2012.

While this 2021 OSRP is based on the 2012 OSRP, it has been revised and updated to reflect current thinking and consensus in the City on the most important recreation and natural resource needs and the best solutions for addressing them. One of the primary focuses of this year's update was to incorporate climate change resiliency into the City's open space planning efforts. The detailed Seven-Year Action Plan provides a step-by-step guide that, when carried out by an Open Space Planning Committee and other City boards and commissions, will successfully implement the City's open space and recreation goals and objectives.

Since the 2012 OSRP, the City of Greenfield has worked to implement some of the Plan's recommendations, including changes to the zoning bylaw to include requirements for Low Impact Development and encourage development in the City's urban center; completing many upgrades at recreational facilities such as adding a Splash Pad at Hillside Park and completing ADA accessibility upgrades, planting needed street trees, and supporting public art installations. The many accomplishments of collaborative efforts between City departments and Committees are further detailed in Section 9 of this plan.

PLANNING PROCESS AND PUBLIC PARTICIPATION

Development of the 2021 Greenfield Open Space and Recreation Plan update was a collaborative effort between the Greenfield Department of Planning and Development, Recreation Department, the Franklin Regional Council of Governments and all other groups represented by Planning Committee members, who are listed at the beginning of the plan.

The process for the 2021 update included a new community survey on the City's open space and recreation needs, as well as eight committee meetings where drafts of chapters were reviewed and revised. Before each meeting, members were sent drafts of sections of the Plan to read. This form of work review was a significant and consistent vehicle for public participation in the development of the OSRP. The survey was widely distributed online via the City's social media accounts, and the social media accounts of various groups in Greenfield such as the Tree Committee and Greening Greenfield. A press release was published in the Greenfield Recorder.

Outreach to the environmental justice areas of Greenfield included putting out paper copies at the City Hall and Public Library, both of which are located in the EJ areas. The survey was also distributed via the Franklin County Resource Network (FCRN) listserv; the FCRN represents over 60 social and human service agencies that serve residents of Greenfield and the surrounding area.

SECTION 3

COMMUNITY SETTING

The information provided in this section, Community Setting, inventories and assesses the human and land use components of the landscape, moving from the present, to the past, and then to the potential future based on current development trends. The Regional Context gives a snapshot of Greenfield today, and identifies the ways in which the location of the City within the region has affected its growth and quality of open space and recreational resources. History of the Community looks back at the manner in which human inhabitants settled and developed the landscape. Next, using statistical information and analysis, Population Characteristics shows the reader who the people of Greenfield are today and how population and economic trends may affect the City in the future. Finally, Growth and Development Patterns describes how the City of Greenfield has developed over time and potential impacts that the current zoning could have on open space, drinking water supplies, and municipal services.

A. REGIONAL CONTEXT

A.1 CITY OF GREENFIELD

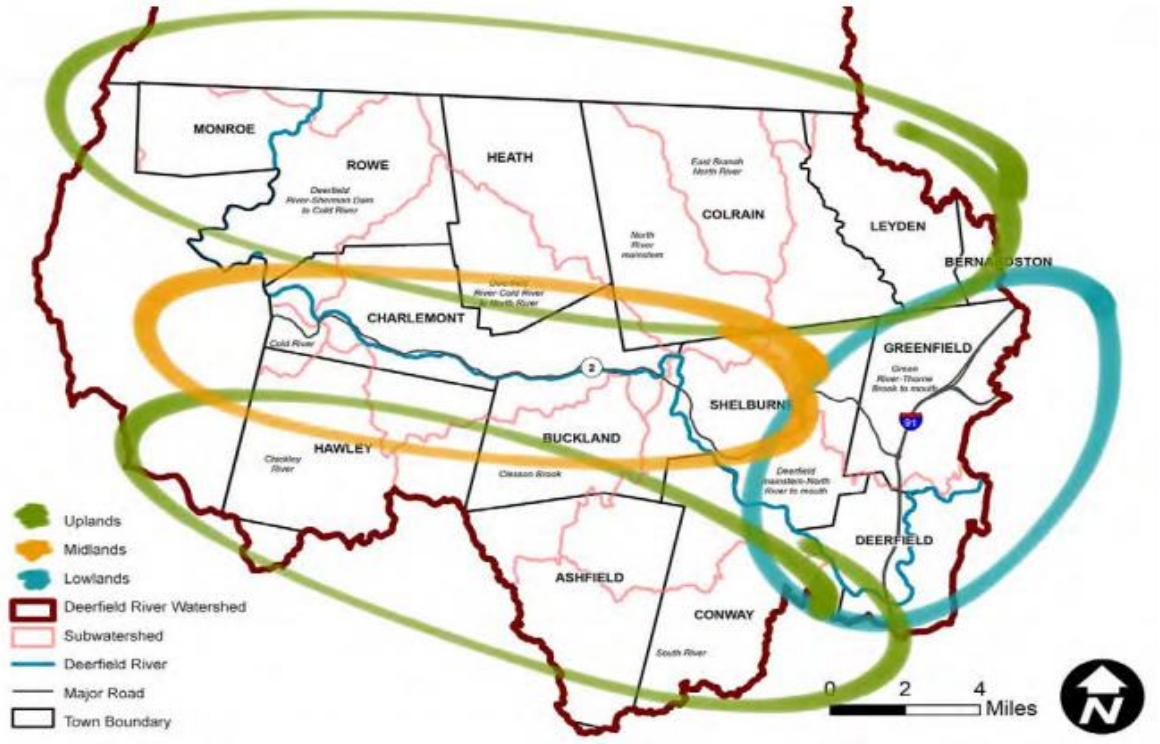
The City of Greenfield is the largest community in Franklin County with a recorded population of 17,468 persons (American Community Survey 2018), approximately 25% of the county's population. In 1811, Greenfield became the County Seat and since that time it has remained the hub of cultural, government, commercial and business activities for the region.

Greenfield is located in the physical center of Franklin County at the crossroads of Interstate Route 91 and Massachusetts Route 2. Its neighboring communities include the towns of Deerfield to the south (population 5,046), Montague to the east (population 8,334), Gill to the northeast (population 1,608), Bernardston to the north (population 2,051), Leyden to the north (population 692), Colrain to the northwest (population 1,800), and Shelburne to the west (population 1,882). Greenfield is close in proximity to many major metropolitan areas including: Springfield, MA (36 miles); Boston, MA (95 miles); Albany, NY (91 miles); and New York City (170 miles).

The City of Greenfield has a wealth of water resources, with four rivers running through its borders. At the southern end of the City is confluence of the Fall, Green, Deerfield, and Connecticut Rivers. The Green River flows through the entire western portions of the City from north to south. To the north of Greenfield it forms the border between the Towns of Colrain and Leyden. The Connecticut River forms the City's eastern boundary adjacent to the Town of Montague, with the Rocky Mountain range creating a natural separation between the densely populated downtown area and the river. The Fall River forms the City's northeastern border with the small and mostly rural Town of Gill. The

Deerfield River forms Greenfield's southern border with the Town of Deerfield. Runoff, point, and nonpoint source pollution from communities upstream of Greenfield affect the quality of the City's rivers. Rivers are a predominant and important natural resource for Greenfield.

Figure 3-1: Deerfield River Watershed



Greenfield is located within two major watersheds – 85% of the City is located in the Deerfield River watershed, and the remaining 15% is in the Connecticut River watershed. The Green River runs north to south through the heart of Greenfield. It is both a water supply source as well as a recreational resource. Greenfield lies at the bottom of the Deerfield River Watershed, in what is known as a lowland area. Lowland areas are characterized by flat, expansive river valleys and floodplains, are densely developed within a combination of residential, commercial, and agricultural land use, and are the least forested portions of the watershed.[1] Figure 3-1 shows Greenfield's position in the watershed, and identifies the towns that are also in the lowlands, and those that are in the uplands and midlands. Changes in land uses in towns identified in the uplands, such as Bernardston or Leyden, may affect Greenfield.

Greenfield's northern, eastern, and western borders are all heavily forested. Much of the City's eastern edge contains the Temple Woods and Highland Park area, whereas the western edge of the City is forested along Route 2 running into Shelburne. Forests along the Green River and Fall River extend into the surrounding towns of Colrain, Leyden, Bernardston, and Gill. The Regional Context map included in

[1] A Framework for Resilience: Responding to Climate Change in the Deerfield River Watershed. Franklin Regional Council of Governments, January 2019.

this section highlights Greenfield's rivers and forests, and where the City is situated within Franklin County.

Natural resources such as water and wildlife populations do not follow political boundaries, and therefore require a regional approach to conservation. Maintaining forest continuity and the purity of watersheds are beyond the control of any one community. Towns and cities across the County need to work together to protect land, promote the conservation of regionally important natural resources, plan growth, and monitor and participate in the cleanup of brooks and rivers.

A.3.2 SHARED OPEN SPACES

As Greenfield is located in the center of the County, many residents from the surrounding towns travel to enjoy the City's open spaces and recreational opportunities. The Greenfield Swimming and Recreation Area is the only designated area for recreational swimming in the City. The area is created by the seasonal flash damming of a section of the Green River along Nash's Mill Road. The facility is open to the public for swimming from the beginning of June through Labor Day. It is widely used by residents and visitors living outside of Greenfield. Greenfield's Hillside Park provides an alternative to swimming with its Splash Pad that operates from Memorial Day through Labor Day and attracts many users throughout the region. Green River Park also creates a regional appeal with a Paws Park for area dogs.

Greenfield's Energy Park is a destination for summer entertainment. The park provides a small, intimate entertainment venue, set just off the hustle and bustle of Main Street in the heart of downtown. The park celebrates its heritage and is modeled after its former use as a Train Station and features a Caboose train car that has been transformed into a museum on transportation history, a train themed play structure, a performance stage designed to look like the original station, and train themed public art. The park is also comprised of demonstrative sustainable energy exhibits, interpretive signage, and herb, native plant, and pollinator gardens.

The Highland Park/ Temple Woods/ Rocky Mountain Park trail network remains a favorite of area hikers with varying trail terrain and scenic vistas including Sachem's Head and Poet's Seat Tower that overlook the valley. The trail network also connects to the regional Pocumtuck Trail, which links Greenfield to the Sugarloaf Mountains in South Deerfield.

The Franklin County Bikeway is a comprehensive network of off-road and shared roadway linkages to destinations throughout Franklin County. The goal is to provide alternative transportation that provides access to employment, educational, cultural and recreational sites. The Franklin County Bikeway currently consists of about 240 miles of trails, although not all of the expanded routes have been marked with wayfinding signs. Maps are available for routes in Eastern[2], Central[3], and Western[4] Franklin County; many of the identified loops for Central County run through Greenfield.

[2] Eastern Franklin County Bikeway Map https://frcog.org/wp-content/uploads/2018/03/Eastern_sm.pdf
[3] Central Franklin County Bikeway Map https://frcog.org/wp-content/uploads/2018/03/Central_sm.pdf
[4] Western Franklin County Bikeway Map https://frcog.org/wp-content/uploads/2018/03/Western_sm.pdf

Greenfield residents also enjoy various open space areas in neighboring communities including but not limited to the following:

· Catamount State Forest, Colrain
· Cook, H.O. State Forest, Colrain
· Barton Cove Recreation Area, Montague
· Montague Plains Wildlife Management Area
· Mount Sugarloaf Reservation, Deerfield
· Mount Toby State Forest, Sunderland
· Northfield Mountain, Northfield
· Northfield State Forest, Northfield
· Wendell State Forest, Wendell
· Erving State Forest, Erving

A.2 REGIONAL SUSTAINABILITY PLAN CONTEXT

In 2013, Sustainable Franklin County: Franklin County's Regional Plan for Sustainable Development (RPSD) was completed by the Sustainable Communities Consortium including Community Action, Franklin County Regional Housing and Redevelopment Authority (HRA), North Quabbin Community Coalition (NQCC), Franklin County Community Development Corporation (FCCDC), and the communities of Greenfield, Deerfield, Montague, and Orange. The RPSD is a long-term guide for Franklin County municipal governments, regional organizations, businesses, non-profits, and individuals. Through extensive public participation, individual residents and representatives of many organizations contributed to the creation of the plan. The plan identifies issues and constraints, goals, and recommendations and strategies. The overall sustainable development goals that came out of the public participation process are as follows:

- Increase and improve the housing stock, while focusing on affordability;
- Provide additional options for alternative transportation;
- Encourage economic development, by redeveloping vacant sites;
- Promote energy conservation and efficiency;
- Protect natural resources, including farmland and drinking supplies;
- Foster the growth of arts and culture;
- Concentrate new growth near town centers and focus on infill development; and
- Improve infrastructure, particularly high speed internet.

The RPSD further notes that development should be concentrated in and around Greenfield's downtown, protecting the City's open spaces, farmland, and forest from fragmentation.

DRAFT

LEYDEN

BERNARDSTON

COLRAIN

GILL

SHELBURNE

MONTAGUE

DEERFIELD

CONWAY

Fall River

Green River

Connecticut River

Deerfield River

91

5

10

2

2A

City of Greenfield
Franklin County Ma.

School

Forest Land Use

Major Road

Rail Line

River, Stream

Water Body

Sources: Map produced by the Franklin Regional Council of Governments Planning Department. GIS data sources include MassGIS and FRCOG. Depicted boundaries are approximate and are intended for planning purposes only, not to be used for survey.

City of Greenfield Open Space & Recreation Plan 2021

Regional Context

0 0.5 1 Miles

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frcog Franklin Regional Council of Governments

B. HISTORY OF THE COMMUNITY

Greenfield's abundance of natural resources supported large populations of the Pocumtuck people prior to European colonization. The Connecticut River floodplain and interior land (such as the Greenfield Meadows) provided Native American occupants with extensive high quality agricultural land. Native fishing most likely focused on the Connecticut, primarily near Turners Falls, a regionally important native fishing area (opposite of Canada Hill), and the Green River. Wild game likely abounded in Greenfield's level lowlands and uplands. Large seasonal sites were likely situated along the Connecticut River, particularly near East Greenfield and Cheapside, and the Connecticut River floodplain west of Cheapside. Smaller sites were probably established on Smead and Rawson Islands on the Connecticut River. Greenfield was probably the site of a semi-permanent horticultural village because of the large quantity of agricultural land and other resources. From the mid to late 1600s, Greenfield's diverse resource base continued to support the Pocumtuck people, who likely participated in trading with colonial residents in Deerfield in addition to the English fur trade network expanding south into the Springfield area.

During King Philip's War, native groups were likely confined to camps in the Cheapside district, and the site was abandoned by the end of the war. After the war, small Native groups likely established encampments in the area's uplands or more isolated lowland locations. The first colonial occupation probably did not take place until the late 1680s when several homes were established on Main Street. Ensuing settlement took place primarily on Main Street and Silver Street to the north. The area in and around Greenfield continues to be the homelands of the Pocumtuck people, some of whom still live in the area.

In 1753, the Town of Greenfield was officially incorporated. As a result, the retail and service sectors grew and Greenfield became the economic and cultural center of Franklin County. Meadow farmers engaged in crop and livestock production and built a 1760 meetinghouse at Silver Street. The establishment of Franklin County in 1811, the Courthouse in 1813, the second church in 1816, and many stores selling Connecticut River trade goods brought new residents.

In the early part of the 19th century, New England rivers began to attract industrial development to its water power sites. Greenfield's crossroad location helped it develop several industrial areas. Factories on the Green River south of the center produced products such as steel stamps, infant carriages, pocketbooks, rakes, and primarily cutlery and precision metal machine tools. The Fall River's Factory Hollow supported sawmills and a large textile mill during the 1900s. John Russell's use of machinery to make chisels, knives and table cutlery revolutionized the industry and brought national attention to Greenfield. It is said that, at one time, 45% of the nation's cutlery was made in Greenfield. The 1912 merger of three firms into Greenfield Tap & Die Corporation brought international fame and business to the town until 1912 when it was moved to Cleveland.

Since its manufacturing heyday, along with other places, Greenfield has diversified its employment to education, health care and small industry. The descendants of the town's manufacturing past are still in Greenfield with some of the former factories.

The Nolumbeka Project is based out of Greenfield and has a variety of resources residents can use to learn about Indigenous populations in New England prior to European contact and during colonization.[5] Greenfield also has an active Historical Society that can provide residents with more information about the City's founding. The information provided in this section was primarily pulled from the Massachusetts Historical Commission's Reconnaissance Survey Report, which is available online here: https://www.sec.state.ma.us/mhc/mhcpdf/townreports/CT-Valley/gre.pdf.

C. POPULATION CHARACTERISTICS

Understanding Greenfield's population characteristics is essential for the City to plan for its future open space and recreational needs and to maximize the use of its open space resources. The following discussion will provide information about Greenfield's population characteristics and an analysis of how the City's open space and recreation planning can respond to those demographics.

C.1 GENERAL POPULATION

As described earlier, the City of Greenfield has the largest population of all the communities in Franklin County with a total population of 17,468 (2018 American Community Survey). Greenfield draws people from throughout the region as the major source of employment, provider of health care services, cultural and entertainment hub, and shopping and dining center. Because of this, much of the downtown area is densely developed as in communities with much larger populations.

C.2 PAST TRENDS/FUTURE PROJECTIONS

According to the 2010 U.S. Census the population decreased by 3.9% between the 2000 and 2010 (Table 3-1). As of 2018, Greenfield's total population is estimated to be 17,468, a very small increase since the 2010 Census results, which reported 17,456 residents.[6] The Massachusetts Institute for Social and Economic Research (MISER) projects that the population of Greenfield will decrease moderately during the years 2018 to 2025 by approximately 1.87%, as indicated in Figure 3-1 below. Greenfield's population is expected to decrease (minimally) through 2040, which aligns with the projected trend for Franklin County.

Table 3-1: Total Population, 1990-2018

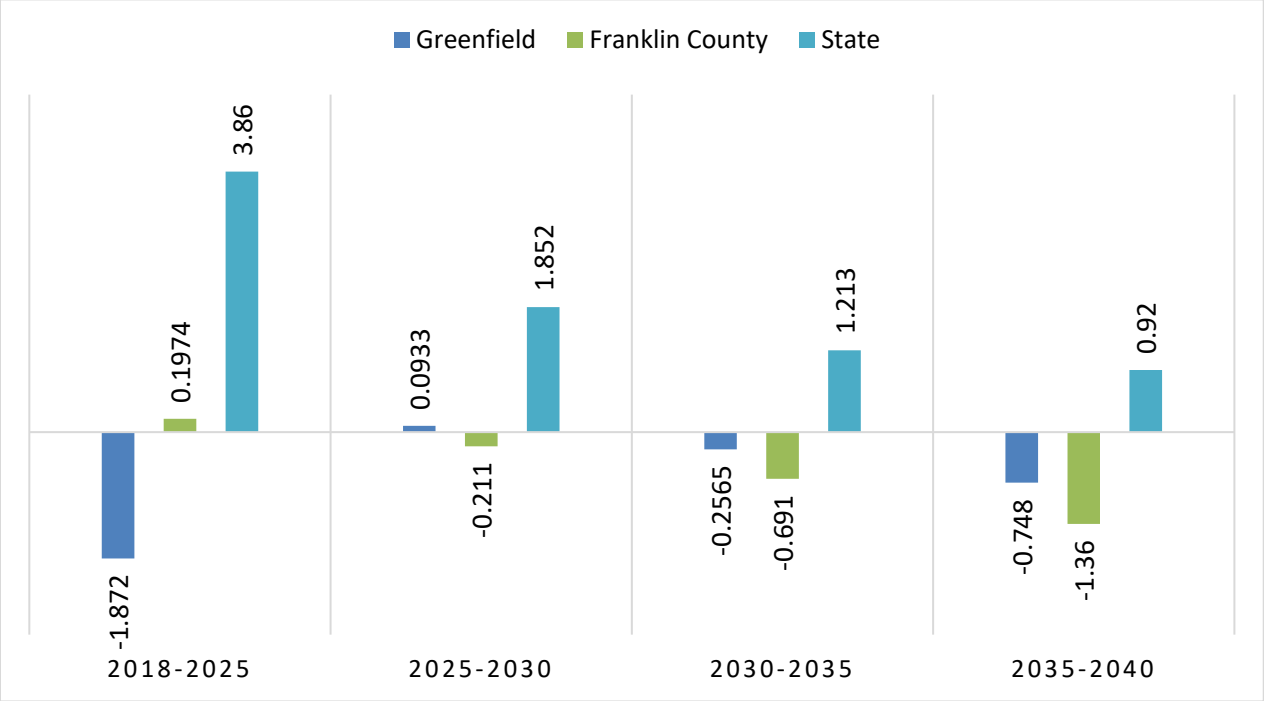
Geography	U.S. Census Population			
	1990	2000	2010	2018
Greenfield	18,666	18,168	17,456	17,468
Franklin County	70,092	71,535	71,372	70,935
Massachusetts	6,016,425	6,649,097	6,547,629	6,830,193

Source: U.S. Census Bureau, 2014-2018 American Community Survey 5-Year Estimates

[5] https://nolumbekaproject.org/

[6] U.S. Census Bureau 2014-2018 American Community Survey 5-Year Estimates.

Figure 3-2: Projected Percent Population Change 2018-2040

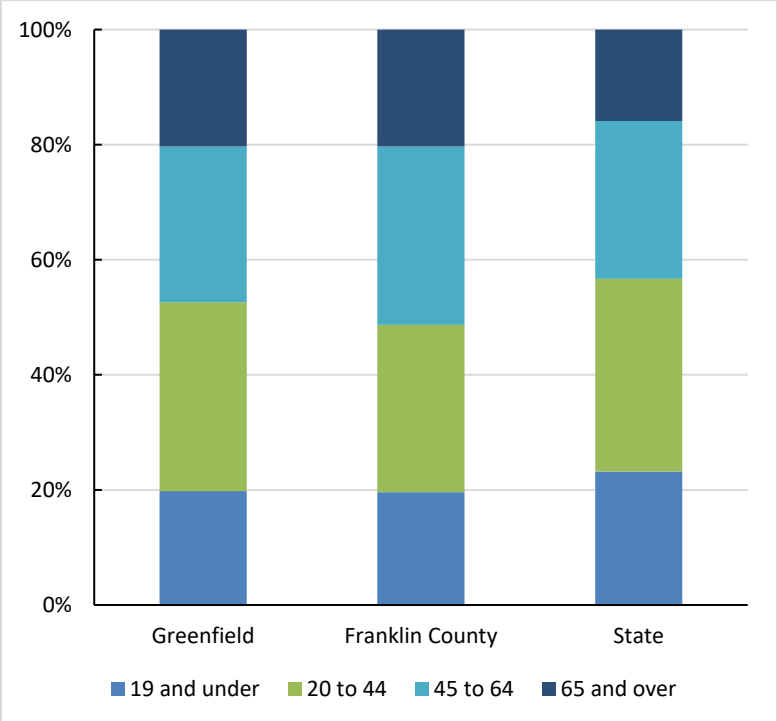


Sources: U.S. Census Bureau 2014-2018 American Community Survey 5-Year Estimates and UMass Donahue Institute-MassDOT Vintage 2018 Population Projections

To determine how the recent and projected population change in Greenfield translates into demand for open space and recreational resources, it is necessary to look at the age distribution of the current and projected population. According to the U.S. Census, shown in Figure 3-3 below, the City of Greenfield has a higher percentage of citizens in the 65 and over age category (20%) than Massachusetts as a whole (16%). The City of Greenfield has a lower percentage of citizens in the 19 and under category (20%) than the State (23%) but has comparable percentages of young adults from 20-44 years of age and adults between 45 and 64 years of age. The City's age distribution of the current population aligns with the makeup of Franklin County.

If the relatively large cohort of elderly residents (65 and over) were to continue to

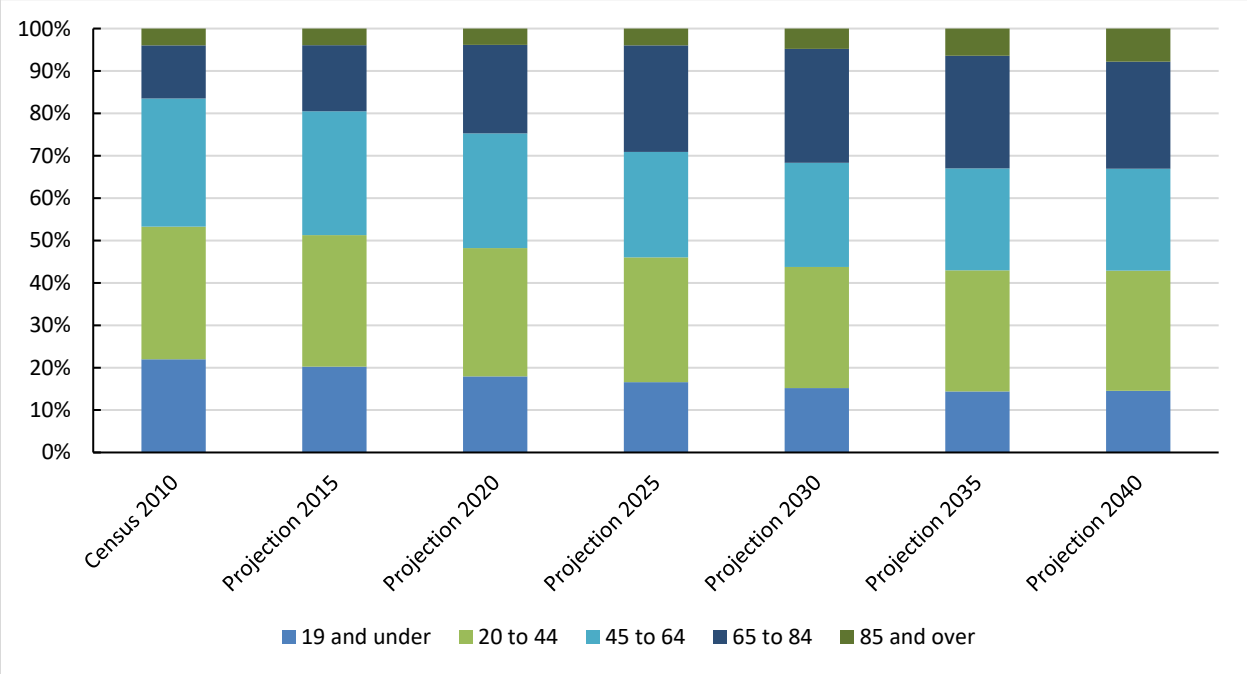
Figure 3-3: Age Distribution, Greenfield, Franklin County and Massachusetts



Source: U.S. Census Bureau, 2014-2018 American Community Survey 5-Year Estimates.

reside in Greenfield, it could result in a significant population of individuals in the oldest age cohorts in ten to twenty years. As shown in Figure 3-4, population projections estimate that by 2030, roughly 27% of Greenfield's population will be between the ages of 65 and 84, compared to 13% in 2010. Additionally, the percentage of the oldest residents (85 and over) is projected to increase from just 4% in 2010 to 8% in 2040. Evaluating the City of Greenfield's current recreation opportunities and how they meet the needs of an aging population, particularly in terms of facilities that are accessible to those with disabilities, is key to developing recreational programming in the coming years that will be attractive to older residents. However, even with an aging population, providing facilities and programs appropriate for all ages will remain an important recreational goal for the City in the future.

Figure 3-4: Greenfield Projected Age Distribution through 2040



Source: UMass Donahue Institute Vintage 2018 Population Projections.

Development pressures may also stem from people relocating from more populous and expensive areas. Greenfield's housing costs are significantly lower than those of much of the region. Greenfield provides opportunities for families to purchase affordable homes and live in a community offering many of the amenities of more expensive areas.

If this trend continues, coupled with the impacts of COVID-19, there may be pressure to build new housing in Greenfield. Many families from more densely populated areas in the eastern portion of the state and bordering states are reportedly interested in rural living opportunities in Franklin County.[7] Greenfield should have a clear plan on what areas to protect, such as farm and forest lands, and what areas are suitable for development.

[7] DeLuca, Zack. Moving to the country: Franklin County sees uptick in homebuyers from cities. Greenfield Recorder, August 2020. https://www.recorder.com/City-folks-moving-to-the-country-35501300

The ongoing COVID-19 pandemic quickly sprung many changes and challenges on Franklin County's residents and businesses. One point of interest that is considered in this update to the City's Open Space Plan is increased development pressure.

Figure 3-5: Single Family Home Sales in Franklin County 2018-2020

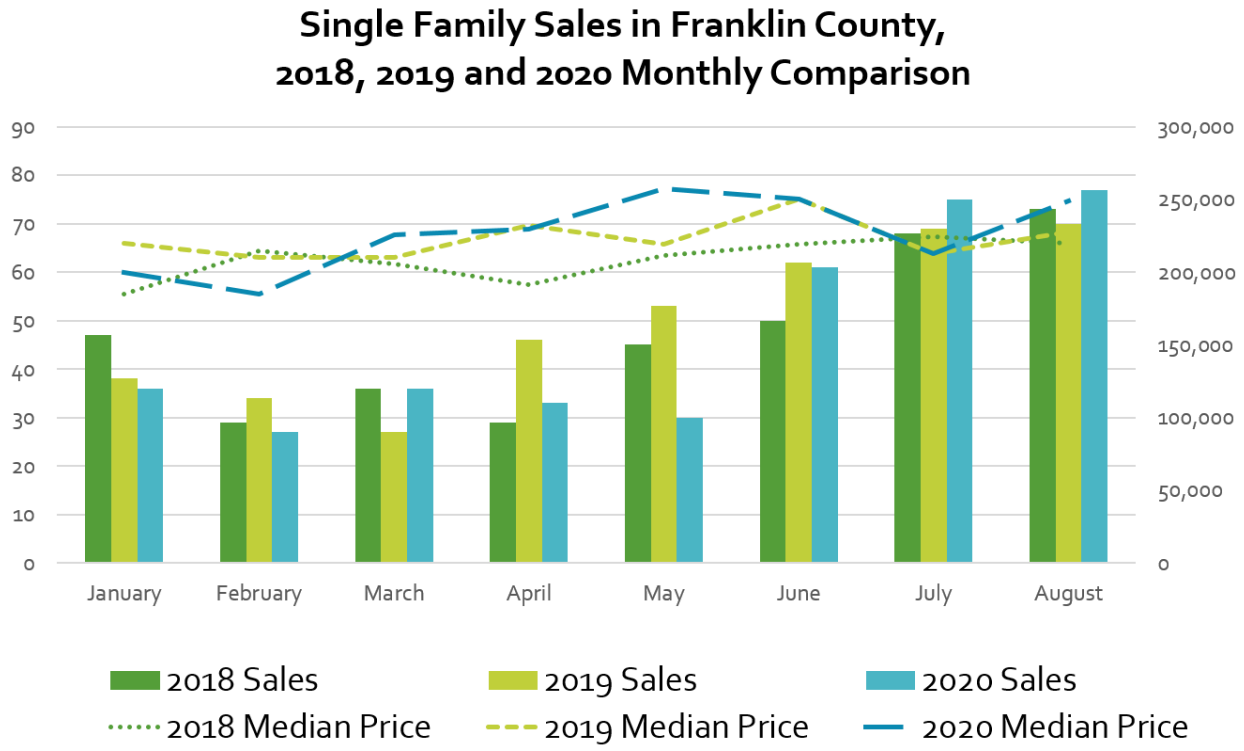


Figure 3-5 above shows the total single-family home sales in Franklin County from 2018 to 2020. Total home sales in July and August of 2020 are slightly higher than in previous years, and there is a slight increase in the median home price beginning in July 2020. Currently there are not enough data to indicate any specific changes with regard to development or population changes. It is important for the City to continue to monitor these trends as more data becomes available and consider where development is likely to occur to ensure farmlands and forests are protected from fragmentation.

C.2.1 ECONOMIC WEALTH OF RESIDENTS AND COMMUNITY

Measures of income levels of Greenfield's residents as compared to the county and state are helpful in assessing the ability of citizens to pay for recreational resources and programs, and for access to open space. The 2018 ACS 5-year estimated Greenfield's per capita income was $30,033, which is lower than both the county and state figures (Table 3-2). The median household income for Greenfield was estimated to be $48,653 in 2018, which was also lower than the county and state estimates. Greenfield's poverty rate of 13.2% is higher than for both Franklin County and Massachusetts as a whole. Of the population with income below the poverty level (2,222) 18% are 60 years of age and up and an additional 13% of residents living in poverty are children under the age of 17.

Table 3-2: Income and Poverty

Geography	Per Capita Income Estimate	Median Household Income Estimate	Percent of Individuals Below Poverty Level*
Greenfield	$30,033	$48,653	13.2%
Franklin County	$34,202	$59,522	10.4%
Massachusetts	$41,794	$77,378	10.8%

* For whom poverty status was determined.

Source: American Community Survey 2014-2018 Five-Year Estimates. Five-year estimate of income for the past 12 months and reported in 2018 dollars.

C.2.2 EMPLOYMENT CHARACTERISTICS

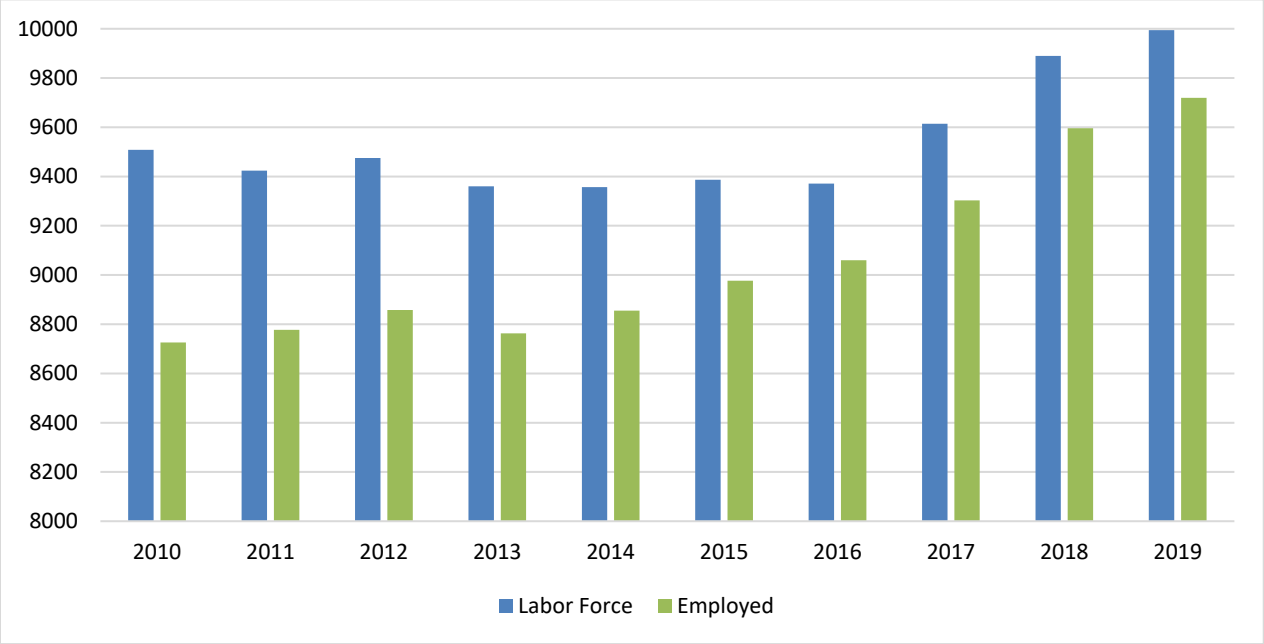
The labor force is defined as the pool of individuals who are 16 years of age and over, and are either employed or who are actively seeking employment. Persons not actively seeking employment, such as some enrolled students, retirees, or stay-at-home parents, are excluded from the labor force. In 2019, the City of Greenfield had a labor force of 9,994 with 9,720 residents employed and 275 unemployed *(*see Table 3-3 below). Greenfield experienced a 2.7% rate of unemployment, slightly lower than the Commonwealth of Massachusetts' rate of 2.9%. The City experienced the same fluctuations in unemployment as the county and state over the course of the last ten years, but the labor force and number of employed persons in Greenfield has steadily increased since 2010 (Figure 3-6).

Table 3-3: Labor Force and Unemployment Data, 2019

Geography	Labor Force	Employed Persons	Unemployed Persons	Unemployment Rate
Greenfield	9,994	9,720	275	2.7%
Franklin County	41,318	40,207	1,111	2.7%
Massachusetts	3,817,437	3,706,556	110,881	2.9%

Source: Massachusetts Executive Office of Labor and Workforce Development, LAUS Data.

Figure 3-6: Labor Force and Employed Persons in Greenfield, 2010 through 2019[8]



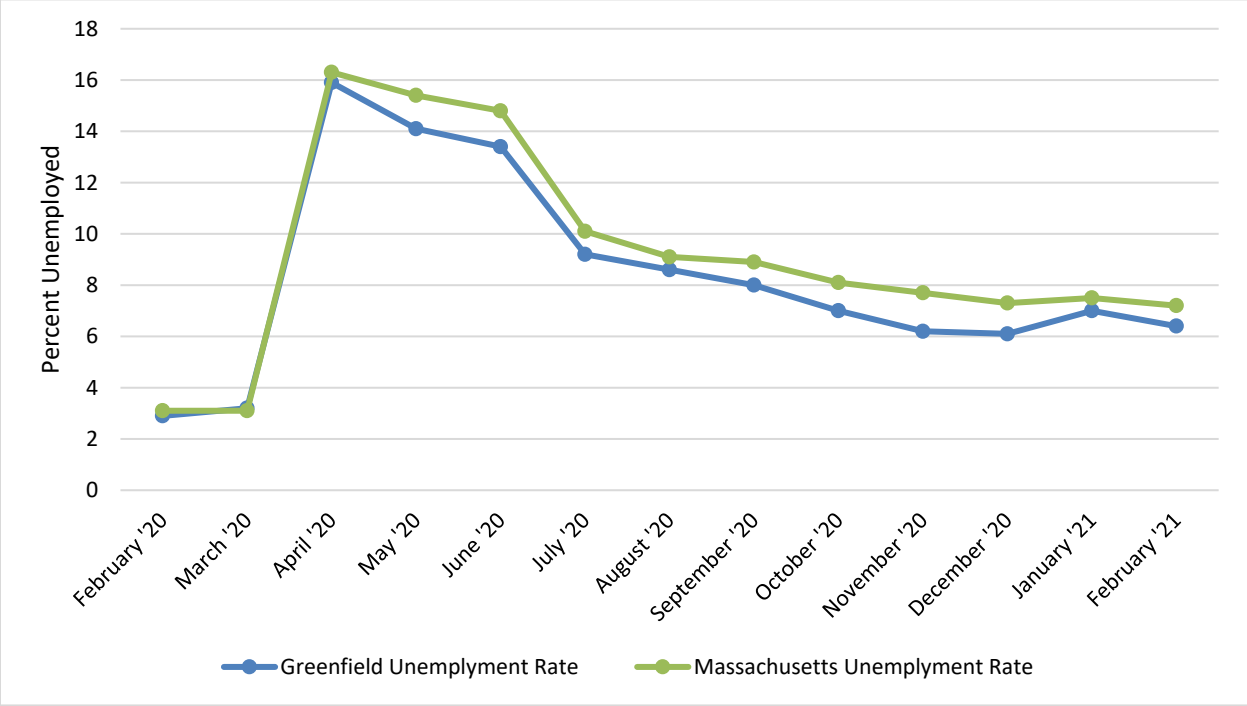
Source: Massachusetts Executive Office of Labor and Workforce Development, LAUS Data.

Unemployment data from the spring of 2020 (Figure 3-7) shows the impact of the ongoing COVID-19 pandemic on Greenfield's workers. In March, the unemployment rate in Greenfield was just 3% and increased to 16% by April. Although Greenfield faced a high unemployment rate, it closely mirrored the trend experienced across the state. Massachusetts workers faced the highest rates of unemployment across the nation during the pandemic.[9] Across Franklin County, Paycheck Protection Program (PPP) loans provided to 892 businesses were able to keep an estimated 10,000 jobs in the region. Beginning in July 2020, the unemployment rate fell to 9% and since then has slowly started to recover. As Massachusetts businesses continue to reopen, employment rates are expected to continue to increase.

[8] Employment data from before 2010 are not shown because the methodology to estimate the labor force size changed in January 2010. Beginning in 2010, Census total population count data are used to develop labor force estimates.

[9] Massachusetts Executive Office of Labor and Workforce Development, Local Area Unemployment Statistics

Figure 3-7: Unemployment Rates in Greenfield and Massachusetts, February 2020 – February 2021



Source: Massachusetts Executive Office of Labor and Workforce Development, LAUS Data.

The Massachusetts Executive Office of Workforce Development collects industry data for towns using the same categories as County Business Patterns, but also includes the public administration sector. Table 3-4 shows the number of workers and the percentage of total workers in each industry sector in Greenfield in 2019. In 2019, educational services, and health care and social assistance was the largest industry in Greenfield, which accounted for 31% percent of employment, followed by retail trade (13%), arts, entertainment, and recreation, and accommodation and food services (11%) and professional, scientific, and management, and administrative and waste management (9%).

Table 3-4: Top Industries for Greenfield Residents

Industry	Total Workers	Percentage of Total
Educational services, and health care and social assistance	2,770	31%
Retail trade	1,164	13%
Arts, entertainment, and recreation, and accommodation and food services	1,013	11%
Professional, scientific, and management, and administrative and waste management	811	9%
Manufacturing	761	9%
Public administration	483	5%
Construction	406	5%

Industry	Total Workers	Percentage of Total
Finance and insurance, and real estate and rental and leasing	394	4%
Other services, except public administration	375	4%
Information	269	3%
Wholesale trade	161	2%
Transportation and warehousing, and utilities	155	2%
Agriculture, forestry, fishing and hunting, and mining	125	1%

Source: U.S. Census Bureau American Community Survey Five-Year Estimates, 2014-2018

Table 3-5 shows the number of establishments and average monthly employees working for Greenfield employers from 2010 through 2019. This includes residents as well as those who reside elsewhere but commute to Greenfield for work. The number of establishments has grown throughout the time period, beginning at 775 establishments in 2010, and peaking at 832 establishments in 2019. The number of total employees working in the City fluctuated between 2010 and 2015, and continually increased, corresponding with the steady increase in employers after 2013.

Table 3-5: Total Establishments and Employment in Greenfield 2009-2019

Year	Number of Business Establishments	Average Monthly Employment	Average Weekly Wages
2010	775	9,923	$679
2011	767	9,969	$683
2012	747	9,856	$700
2013	767	9,752	$727
2014	780	9,787	$740
2015	789	9,757	$777
2016	818	10,055	$793
2017	812	10,391	$810
2018	830	10,519	$839
2019	832	10,587	$869

Source: Massachusetts Executive Office of Labor and Workforce Development, Employment and Wages Data (ES-202).

Analysis

Greenfield's population has decreased slightly over the last couple of decades, and this trend is projected to continue through 2050. Although the size of the population in Greenfield is not facing any significant changes, the makeup of City residents may begin to shift. For example, approximately 20% of the City's residents are currently aged 65 years or older, but this may increase to 33% of the City's residents by 2040.

Recent zoning changes such as the addition of an Accessory Dwelling Unit (ADU) Ordinance support the City's aging population. The ADU Ordinance allows homeowners to build up to 900 square foot apartments as either attached or detached units. With the adoption of the ADU Ordinance, homeowners have the opportunity to receive additional income, provide social and personal support to a family member, or obtain greater security. ADUs can be particularly helpful to elders as they "age in place," by receiving supplemental income and possible maintenance assistance from tenants. ADUs also provide affordable housing choices for others, such as young adults just starting out on their own.[10]

According to Greenfield's Department of Planning and Development, there are no specific areas in the City that are more likely to be developed in the future for housing needs. There are existing approved subdivisions where lots are still being developed, such as the McHard Acres subdivision off Country Club Road, and the High Point subdivision off Homestead Avenue. The last definitive subdivision plan approved of 5 lots or more was completed in 2007 for Solar Village. The current trend in the City has been for homeowners to perform renovations rather than selling their homes to upgrade.

Factors such as sea level rise and stronger storms on the coast are hard to integrate into population projections. Rising sea levels on the coast of Massachusetts and neighboring states may drive people to areas such as interior New England. Rising temperatures, wildfires, and other climate change impacts could also lead to a migration of people from southern and western parts of the country to the Northeast. With improved broadband service and passenger rail service in the region, Greenfield may become an attractive place for new residents to locate. Planning for growth before it happens will help to protect open space and recreation resources into the future while providing a livable community for people of all ages.

C.2.3 ENVIRONMENTAL JUSTICE POPULATIONS

The State of Massachusetts defines an environmental justice (EJ) community if any of the following conditions are met:

- Block group whose annual median household income is equal to or less than 65 percent of the statewide median ($62,072 in 2010); or
- 25% or more of the residents identifying as minority; or
- 25% or more of households having no one over the age of 14 who speaks English only or very well - Limited English Proficiency (LEP)

According to these criteria, the City of Greenfield has three Census Block Groups that are EJ populations based on income. The population in these three EJ block groups is 3,438, or approximately 20% of the City's population[11]. As seen in the Environmental Justice Area map, EJ populations in Greenfield are located in the Leyden and Plain Road Area and the City center and surrounding area. One concern

[10] 2014 Greenfield Housing Study

[11] 2010 Environmental Justice Populations in Massachusetts, Massachusetts Executive Office of Energy and Environmental Affairs

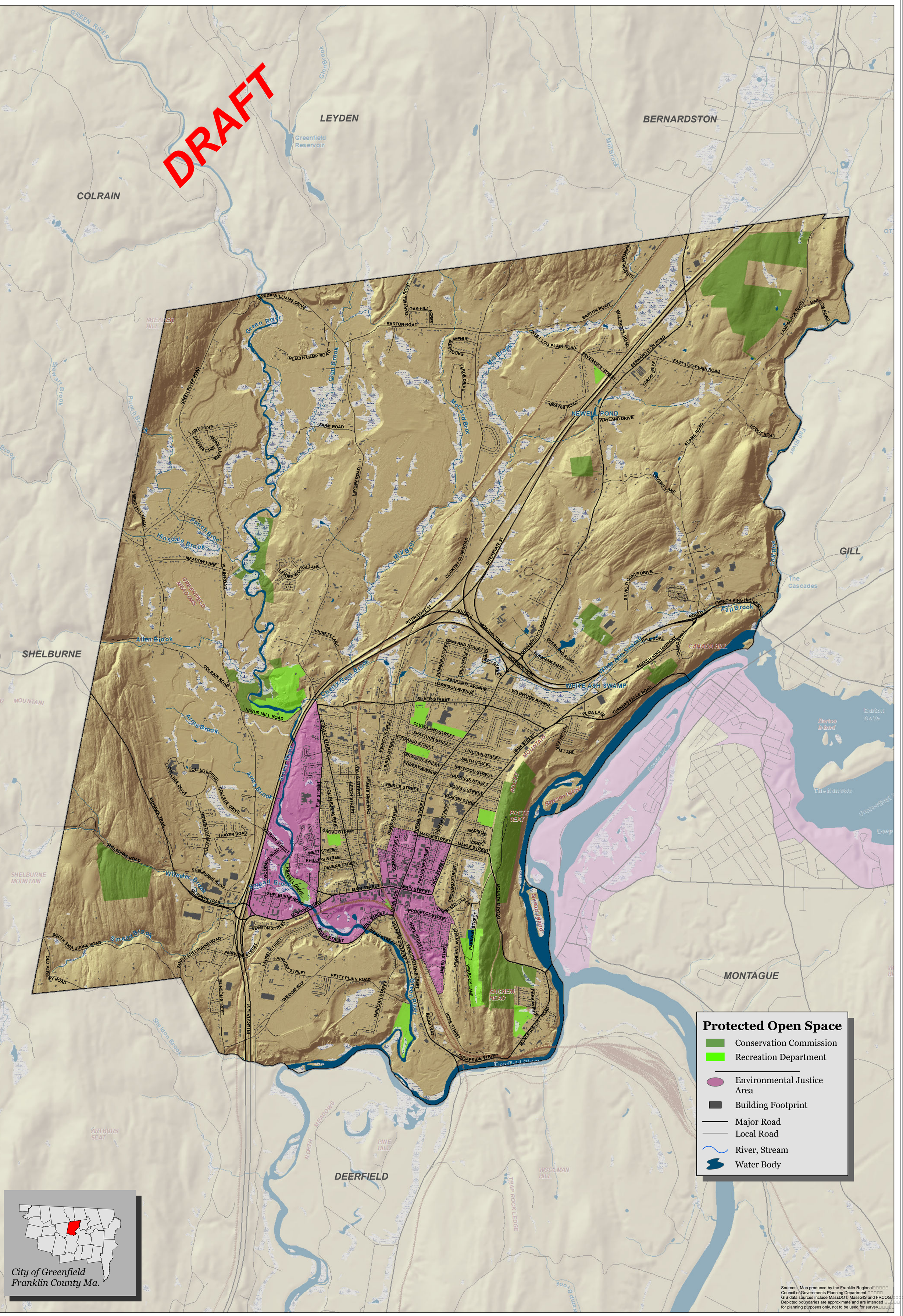
brought forward in Greenfield's Sustainable Master Plan is that almost 20% of the residents in the Leyden and Plain Road Area do not have access to a car. Therefore, it is important to keep accessibility to and from these areas when considering opportunities for open space and recreation projects and expanding Greenfield's services.[12]

[12] 2014 Greenfield Sustainable Master Plan

DRAFT

City of Greenfield Open Space & Recreation Plan 2020

Environmental Justice Area



D. GROWTH AND DEVELOPMENT PATTERNS

D.1 PATTERNS AND TRENDS

As previously noted, Greenfield began as an agricultural community, but soon evolved into a trading center because of its ideal location at the confluence of the Green, Deerfield, and Connecticut Rivers. The City's rich river resources became an attractive site for industrial development during the Industrial Revolution, therefore, many mills and factories are located throughout Greenfield. As a result, the City's development patterns have been similar to many other traditional New England towns, characterized by a compact downtown with two and three storied brick and wood structured buildings, surrounded by densely developed residential neighborhoods. The densest development occurs in the southeastern portion of the City and is now encircled by Interstate 91/Route 2. The zoning over the years has led to denser residential and commercial development in the urban core and larger residential lots in the rural areas. The density in the downtown core area of Greenfield varies as some parcels are vacant and others are underutilized. This provides opportunities for infill development to support more concentrated and sustainable growth located near transit and services, and relieves the pressure to develop along the outskirts of the City where expansion of the infrastructure may be needed.

While Greenfield's population is not currently expanding (according to 2010 U.S. Census & the 2018 American Community Survey) the City's open land continues to diminish as these areas slowly change use over time. Increasing suburbanization has occurred in these rural areas, with the development of residential frontage lots along rural roadways. This pattern of development is allowed through the Approval-Not-Required (ANR) process, which requires only a sign-off by the Planning Board certifying that the division of land meets the dimensional standards in the Zoning Ordinance. Farmland is gradually reduced through ANR development as farmers sell portions of their farms to people who want to build single-family homes, for example. This type of development has significant impacts on the rural character of the landscape. The changes are slow but constant and, over time, open areas become house-lined streets, one house deep, which is a major contributor to suburban sprawl.[13]

An analysis completed as a part of the City's Sustainable Master Plan determined the primary land use changes in Greenfield from 1971 to 2005. The primary findings indicated that agricultural land decreased, low-density residential development increased, and land for open space and recreation increased slightly. These land use figures are based on 2005, 1999, 1985, and 1971 land use data provided by MassGIS, which classified land uses based on aerial photograph interpretation conducted by the Department of Forestry's Resource Mapping Project at the University of Massachusetts, Amherst. Their data collection and analysis methodologies evolved over those decades, and as a result, comparisons can provide only an *estimation* of the trends in land use change over the years. Direct comparisons between the various datasets cannot be made with precision.

[13] 2014 Greenfield Comprehensive Sustainable Master Plan

The following table is based on a new land cover/land use dataset provided by MassGIS and released in May 2019. This statewide dataset contains a combination of land cover mapping from 2016 aerial and satellite imagery, LiDAR and other data sources. Land use mapping is derived from standardized assessor parcel information for Massachusetts. This land cover/land use dataset does not conform to the classification schemes or polygon delineation of previous land use data from MassGIS (1951-1999; 2005) so comparisons of land use change over time can't be made using this current data.[14] However, these data provide a snapshot of the City's current land cover and land uses.

Table 3-6: Greenfield 2016 MassGIS Land Cover and Land Use Data

Land Cover	Acres		Land Use	Acres
Bare Land	181.42		Agriculture	1074.89
Cultivated	577.62		Commercial	687.55
Deciduous Forest	3696.09		Forest	220.78
Developed Open Space	1691.84		Industrial	143.85
Evergreen Forest	4030.73		Mixed use, other	1144.11
Grassland	482.38		Mised use, primarily commercial	55.64
Impervious	1592.63		Mixed use, primarily residential	931.39
Palustrine Aquatic Bed	5.57		Open land	2348.57
Palustrine Emergent Wetland	95.18		Recreation	186.52
Palustrine Forested Wetland	713.87		Residential - multi-family	945.23
Palustrine Scrub/Shrub Wetland	32.06		Residential - other	125.98
Pasture/Hay	681.81		Residential - single family	3251.58
Scrub/Shrub	50.08		Right-of-way	1392.51
Water	188.72		Tax exempt	1183.05
			Unknown	81.90
			Water	246.45

According to the 2016 MassGIS data in Table 3-6, approximately 60 percent of Greenfield's land cover is forest (a combination of Deciduous Forest, Evergreen Forest, and Forest land use categories). Of the total 14,020 acres in Greenfield, approximately 7.6 percent of the city is classified as agricultural land use, and 37 percent of the city is classified as residential land use. About 6 percent of the total area in the city is comprised of commercial or industrial land uses.

The City of Greenfield issued 51 building permits for the construction of new homes, and nine building permits for new commercial businesses from January 2015 – October 2020.[15]

[14] https://docs.digital.mass.gov/dataset/massgis-data-2016-land-coverland-use

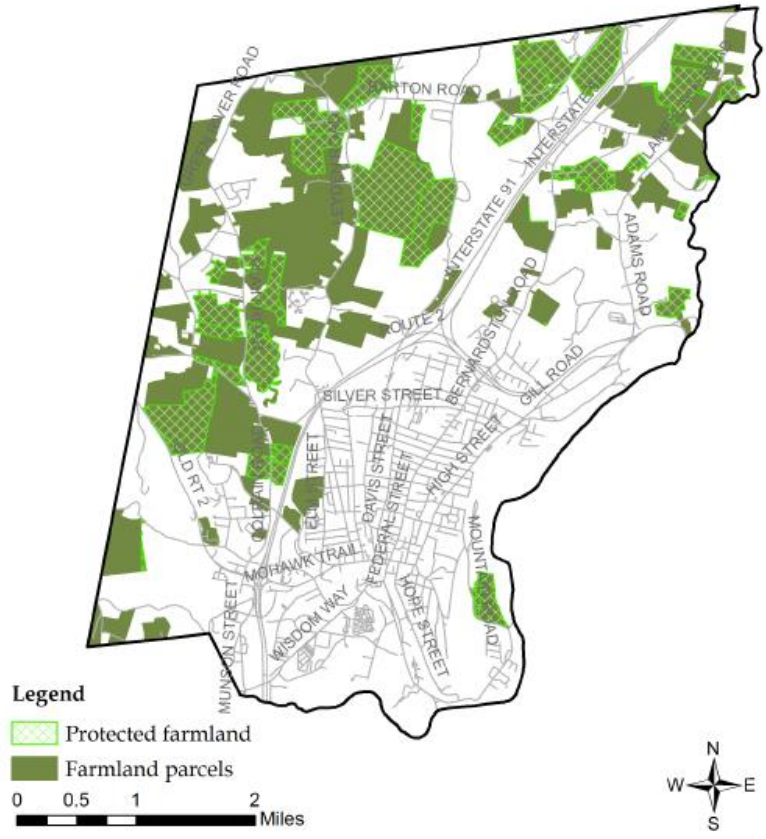
[15] City of Greenfield Inspections/Enforcement, Personal Communication, November 2020.

As previously noted, the majority of recent new residential development has occurred in the McHard Acres subdivision off Country Club Road, which is abutted by conserved farmland. Other pockets of residential development have occurred in the area of Greenfield bound by Interstate 91 and Route 2, away from identified farmland parcels. Of all the residential building permits that have been recently issued, five were for multifamily homes. Additionally, the City issued forty-nine building permits from 2015 – 2016 (not included in Table 3-7) to renovate apartments in the Leyden Woods Apartment Complex. Commercial development has remained relatively low in recent years. Like many communities, much of Greenfield's commercial development is in the downtown area and along the main transportation arteries of Route 2 and Routes 5 & 10. Dense residential development surrounds these commercial areas, with rural development primarily in the north section of the City.

Table 3-7: New Residential and Commercial Building Permits Issued in Greenfield January 2015 – October 2020

Year	# of new residential building permits issued	# of new commercial building permits issued
2015	6	1
2016	5	1
2017	16	3
2018	8	2
2019	4	1
2020	12	1

Figure 3-8: Unprotected and protected farmland parcels in Greenfield



Source: Mount Grace Land Conservation Trust

Although development patterns show that the amount of farmland within Greenfield's borders has decreased over time, there has been a resurgence in farming in Greenfield in the past decade. As further detailed in Section 5 of this plan, acres of farmland permanently conserved through the APR program increased by 52%, and temporarily conserved farmland through the Chapter 61A program increased by 43%. The Greenfield Community Farm, a project of Just Roots, opened in 2013 has 60 plots available for individuals and organizations to grow their own food. The preservation of the 61-acre parcel of land that the farm is situated on was a collaborative effort between The City of Greenfield, Mount Grace Land Trust, the Pleasant Street Community Garden, and Greening Greenfield. Many other farming operations are active in Greenfield, including some farmers

leasing their land to other farmers so they can expand their practices. For example, the Just Roots Farm sublet land to a farmer so he was able to raise pigs.[16]

Agriculture is important to Greenfield's community and character; efforts to preserve remaining farmland to ensure local food production are of priority to the City and are detailed in Section 9, the City's Sustainable Master Plan, and forthcoming Municipal Vulnerability Preparedness Plan.

D.3 INFRASTRUCTURE

D.3.1 TRANSPORTATION SYSTEM

Greenfield's transportation network is an important consideration in relation to open space and recreation planning for two main reasons:

1) Changes to the transportation network can be a significant contributor to future growth in the community and to the resulting impact of this growth on the character of the open space environment; 2) The ability of Greenfield's residents to enjoy recreation and open space opportunities within the City's boundaries, and elsewhere, is largely dependent on the ease of access to these opportunities by automobiles, bicycles, pedestrians, and public transportation.

Greenfield has historically been a principal transportation crossroads due to its proximity to the Deerfield and Connecticut Rivers. Indigenous peoples used the rivers to travel along regional routes and connect to trail systems. Post colonization, waterways were used to ship heavy goods down the Connecticut River to the Cheapside section of Greenfield. From there, they were carried on land to Deerfield and other areas. Later, two stagecoach routes ran directly through the City: one that connected the capital cities of Boston, Massachusetts and Albany, New York: and another connecting Springfield, Massachusetts to Hanover, New Hampshire. Today, Greenfield continues to be a transportation crossroads as the Regional Transit Center for the county is located in Greenfield. Construction of the John W. Olver Regional Transit center was completed in December 2011, and is the nation's first zero-net energy transit center.

D.3.2 ROADS AND HIGHWAYS

Because Greenfield is such an important transportation crossroads, it has been generally referred to as the "Gateway to the Berkshires". Greenfield has a total of 163 miles of roadway[17] running through its borders, including Interstate 91 and State Route 2. Interstate 91 connects Greenfield and Franklin County with northern and southern New England. The interstate replaced Routes 5 and 10 as the main north-south route for western New England in the early 1970s. Running east-west, Route 2 is the major cross-state road in northern Massachusetts. It provides direct access east to Boston and west over the Berkshires to New York State.

The construction of Interstate Highway 91 created a barrier between the City's central urban core and

[16] Jessica O'Neill, Personal Communication, January 2021.

[17] FRCOG Road Inventory 2017

its outlying rural areas. Although this contrast in development patterns is not as distinct as it once was, due to suburban commercial development along the Mohawk Trail (Route 2), the highway still acts as a visual and psychological barrier between the historic downtown and the outlying agricultural and natural areas. Improvements in connections between these two parts of the City are very important to enable residents to access open space resources such as the Green River Swimming and Recreational Area. The Riverside bikeway is one example of the City's commitment to improve the connection between these two areas of Greenfield.

D.3.3 RAIL

Since the 1840's, railroads have moved people and freight through Greenfield. The Boston and Maine Railroad has two important lines that converge in Greenfield, one that runs from Boston to New York State and the other that runs from Springfield, Massachusetts in to Vermont.

In August 2019, the Valley Flyer train service began, which runs from Greenfield to New Haven, Connecticut. The service will run seven days a week and allow passengers to travel from Greenfield to New York City and back in a single day. The John W. Olver Regional Transit Center will serve as the hub of the Valley Flyer service and other public transportation options in and around Greenfield. The expanded train service is expected to improve travel options within the Connecticut River Valley and provide an economic boost to Franklin County.

D.3.4 PUBLIC TRANSIT

In August 2006, the Franklin Regional Transit Authority (FRTA) assumed responsibility of providing services to Greenfield and Montague; transportation has previously been operated by the Greenfield Montague Transportation Area (GMTA). Since then, FRTA has increased their fixed route service to nine routes with services expanding to Greenfield, Montague, and Amherst.

The FRTA currently serves forty communities throughout Franklin, Hampden, Hampshire, and Worcester Counties. With 45 vehicles, FRTA covers the largest (1121 square miles) and the most rural geographical area in the State. Each of FRTA's fixed routes originate in Greenfield. By using a network of public and private transportation providers, The FTRA can arrange transportation by request for elders and disabled residents within the 40-town area. Transportation is also available to medical appointments (e.g. – radiation, dialysis, or chemotherapy) outside of the county for ambulatory elders 60 years old or older who reside in Franklin County. This is made possible by contracts with the Department of Medical Assistance (DMA), Department of Developmental Services (DDS), and the Department of Public Health (DPH).

Public transportation does not currently serve parks and recreation areas in the City. More rural lands, such as the GTD/Griswold Conservation Area and other areas to the north, are accessible only by car. Public transit access should be a consideration when locating new recreational areas in the City.

D.3.5 BIKEWAYS

The Riverside Greenway section of the Franklin County Bikeway was completed in November 2004. The Riverside Greenway is a one-mile long off-road shared use path located in the City of Greenfield. This path connects a densely populated residential area with a heavily used public recreation facility. It also connects to nearby Greenfield Community College and downtown Greenfield. The path is owned and maintained by the City of Greenfield, and includes a bicycle and pedestrian bridge over the Green River.

The Canalside Trail Bike Path is located in the towns of Montague and Deerfield. The Canalside Trail connects from the Connecticut River Great Falls Discovery Center and Unity Park in the Village of Turners Falls in Montague, to McClelland Farm Road (located off River Road) in northeast Deerfield. This section of the bikeway is an approximately three-mile offroad shared use bicycle path which travels along an approximately ten-foot wide paved path adjacent to the Connecticut River Canal in Turners Falls and along an abandoned rail corridor (including a railroad bridge over the confluence of the Deerfield and Connecticut Rivers) in Deerfield and Montague City.[18]

As previously mentioned in the section detailing Greenfield's shared open spaces, from 2008-2009 the Franklin Regional Council of Governments expanded a network of off-road and shared roadway facilities throughout Greenfield/Franklin County. These facilities are intended to provide safe travel options for bicycle and other self-propelled transportation modes, which will provide for continuous travel options within the county. The entire county-wide network is approximately 240 miles.

D.3.6 SIDEWALKS

Most of the City's 80 miles of sidewalks are located in the more densely populated urban areas (near downtown), with fewer sidewalks located in the more rural areas. The City is actively repairing and replacing sidewalks to allow for safer pedestrian access, and has a prioritization plan through their Complete Streets Plan. Walking is an important mode of transportation that is widely used by many residents young and old, and it is an important consideration when developing any new recreational facilities. Many of the bus stops are located along roadways that have sidewalks allowing for convenient pedestrian connections.

Street trees are a necessity for pedestrians, especially as the northeast continues to experience increasing temperatures. Ensuring shade trees are planted along sidewalks will greatly benefit the City's residents and help to keep them cool while traveling around Greenfield by foot. Additionally, shade trees can improve stormwater management. Although the DPW tries to plant shade trees whenever sidewalks are repaired, the City could work to create and adopt a policy that would ensure shade trees are planted whenever a sidewalk is repaired/replaced.

D.4 WATER SUPPLY SYSTEM

The majority of Greenfield residents, approximately 95%, are served by the municipal water supply system. In addition, Greenfield sells water to the Riverside section of Gill and the East Deerfield Water District and provides emergency backup supply for Old Deerfield Water District. The City's distribution

[18] 2009 Franklin County Bikeway Map

system has the potential to serve all the undeveloped areas of the City. Greenfield presently relies on both ground and surface water for its municipal water supply. Ground water is supplied by the Millbrook wells located in the northeastern section of the City near the Bernardston border. The City, through a zoning provision in 1989, established a Water Supply Protection District, which is an overlay district composed of three (3) zones, designed to protect, preserve and maintain existing and potential sources of groundwater supply, groundwater recharge, and watershed areas.

Greenfield has also identified and designated, through zoning, an area off of Green River Road, referred to as the Leary well site, as a potential well site. The water supply district restricts the types of uses and the dimensional requirements of uses located in these districts. It is unlikely that this well will be developed, due to the difficulty in constructing the necessary infrastructure in the flood zone, and because it would be drawing from the same source as the surface supply below. Surface water is supplied by the Green River behind the dam on Eunice Williams Road and by the Leyden Glen Reservoir in Leyden. Over the course of an average year, approximately 30% of the City's water supply is drawn from the Leyden Glen Reservoir, about 45% from the Millbrook Wells, and about 25% from the Green River. The City could not meet its summer water demands without the Green River source.

The water distribution system serves approximately 90% of the geographic area of the City. As previously mentioned, there is potential to serve almost all of the underdeveloped areas of the City with the existing resources. The water system consists of the following sources:

Millbrook Wells - The three (3) wells supply high quality, naturally filtered water, which is pumped from a single subsurface aquifer.
Leyden Glen Reservoir - The dam impounds 45 million gallons of water. The City-owned watershed contains over 350 acres of steep forested land. As a matter of policy, the land is not open to the public.
Green River - The water is drawn from behind the dam off Eunice Williams Drive. The source is used during the peak demand periods in the summer months.
Leary Wells - A future well site for municipal water supply located between Leyden and Green River Roads. Currently not used.

D.5 SEWER SERVICE

Located in the flood plain of the Green River, Greenfield's municipal sewer system services the City's central, urbanized area and approximately 75% of residential dwelling units. One main interceptor and four trunk sewers feed the wastewater treatment plant located on the Green River at the very southern end of the City. The plant discharges its effluent into the Deerfield River. This facility underwent a $9.2 million dollar upgrade – including flood proofing up to 140 feet – in 2000. In 2011 Tropical Storm Irene's floodwaters reached 142 ½ feet and inundated the wastewater treatment plant. Because of this event, another round of upgrades at the plant was completed in 2014 to raise the flood doors 144.3 ft.

There has been no expansion of the sewer system. Unsuitable soil conditions prevent development in areas not served by the municipal sewer. The possibility of extending sewerage service northerly along Adams Road has been investigated, as well as extended north on Colrain Road. If the City decides to

build the Mill Brook extension there is the potential of opening up approximately 70% of the northern section of the city to development. Land that is currently undeveloped because of a lack of soil suitability for septic systems will then be able to be developed. The City will need to consider the impact of a sewer extension to the existing unprotected open space in this section of city including the potential loss of farmland because of the added value of municipal sewers near or on the property.

D.6 LONG TERM DEVELOPMENT PATTERNS

Since 1957, Greenfield's growth patterns have been guided by zoning regulations. The City currently has eleven (11) different zoning districts to ensure new development occurs in areas of Greenfield deemed appropriate. The City has a legacy of many pre-existing uses, which are no longer allowed by the present zoning regulations. The Greenfield zoning districts are as follows: Urban Residential (RA), Suburban Residential (RB), Rural Residential (RC), Semi-Residential (SR), Health Service (H), Central Commercial (CC), General Commercial (GC), Limited Commercial (LC), Office (O), General Industry (GI), and Planned Industry (PI).

D.6.1 ZONING CONTROLS

The following is a descriptive list of specific land use controls Greenfield has put in place through the use of zoning to ensure the preservation of the City's rural character, open space, and natural resources.

Rural Residential District – The purpose of the district is to provide areas for low-density residential development and agricultural uses. The minimum frontage requirement is 200 feet, a minimum lot area of 40,000 square feet for a single-family residence and a minimum lot area of 50,000 square feet for a two-family residence.

Open Space/Cluster Development – The purpose is to allow for a flexible design in residential development of single or multi-family housing.
The intention is to:

1. Promote a more efficient use of land in harmony with its natural features;
2. Encourage a less sprawling form of development that consumes less open land;
3. Encourage the permanent preservation of open space, agricultural lands and other natural resources;
4. Facilitate the construction and maintenance of streets, utilities, and public services in a more economical and efficient manner;
5. Promote diverse housing at a variety of costs.

Water Supply Protection District - The overlay district is composed of three (3) zones with the purpose of the Water Supply Protection District is to protect, preserve and maintain existing and potential sources of groundwater supply, groundwater recharge and watershed areas within the City for the public, health, safety and general welfare of the community. The Water Supply Protection District includes Zones 1, 2 and 3 as shown on the map titled "Aquifer Zone Delineations" dated March 1988 and the "Aquifer Zone Delineations Leary Well Site" dated February 1989. Also included in the Water Supply Protection District is Leary Well Site Zone 1 and the ½ mile interim Zone 2 required by the

Department of Environmental Protection. The Leary Well Site Protection District is shown in Map 6.

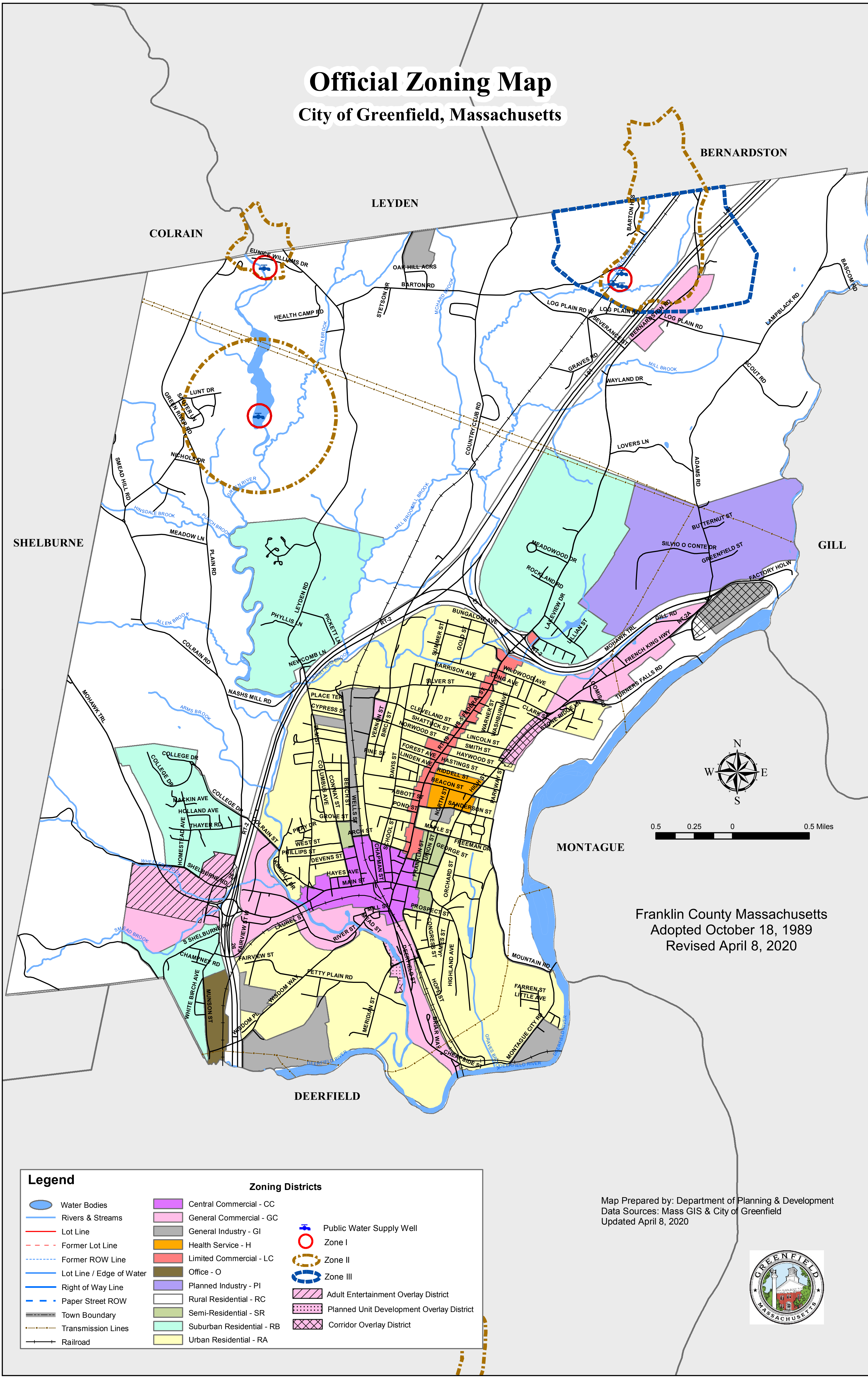
Flood Plain District - An overlay district with the purpose of preserving the natural flood control characteristics and the flood storage capacity of the floodplain. It is also meant to preserve and maintain the groundwater table and groundwater recharge areas within the floodplain. Uses are permitted that cause no obstructions to flood flows and do not require structures, fill, or storage of materials or equipment. The boundaries of the Flood Plain District are shown on the City of Greenfield Flood Insurance Rate Map (FIRM) dated July 2, 1980. In early 2021, the City of Greenfield updated their Floodplain District bylaw using the new 2020 MA State Model Floodplain bylaw. The updated model bylaw includes all of the requirements for NFIP communities that were not included in other state codes such as the building code or Wetlands Protection Act.

Corridor Overlay District - An overlay district designed to promote an attractive entryway into Greenfield and whose purpose includes protecting scenic and natural features of the landscape through ridge and slope protection, vegetative buffer requirements, and design guidelines within the district.

In addition to the tools listed above, the Greenfield could consider adopting additional zoning by laws to encourage open space protection and climate resilience. The Sustainable Greenfield Master Plan recommends that the City create a Neighborhood Pedestrian Zone (NPZ) to allow for more housing units on smaller lot sizes. A typical NPZ is intended for existing established areas where a community wants to promote increased pedestrian activity. They can range in size from just several houses to larger developments. The NPZs would help increase the City's housing stock, while doing so in sustainable locations near jobs, services, schools. Providing housing near services would minimize transportation costs, which would benefit lower income households keeping their living costs more affordable.[19]

The City could also consider adapting the Model River Corridor Protection Zoning Overlay District to protect and manage the Green River Corridor. The River Corridor area of the Green River, which runs through the City, was mapped using a scientific protocol that was developed as part of a MassDEP 319 project completed by the FRCOG, and is detailed in *The Green River Corridor Mapping and Management Report*. The River Corridor Overlay District would provide help managing river corridors to promote river restoration and protection, create climate resilient land uses, and reduce the harm to land, water, habitat, people, and infrastructure caused by increasingly severe and frequent flood events.

[19] 2014 Greenfield Housing Study



Official Zoning Map
City of Greenfield, Massachusetts
LEYDEN
COLRAIN
BERNARDSTON
SHELBURNE
GILL
MONTAGUE
DEERFIELD
EUNICE WILLIAMS DR
OAK HILL ACRS
BARTON RD
BARTON HTS
BARTON BROOK
STETSON DR
HEALTH CAMP RD
GLEN BROOK
MCHARD BROOK
LOG PLAIN RD W
LOG PLAIN RD
SEVERANCE ST
BERNARDSTON RD
LAMPBLACK RD
BASCOM RD
GRAVES RD
I-91
MILL BROOK
WAYLAND DR
SCOUT RD
LUNT DR
SAUTER LN
GREEN RIVER RD
COUNTRY CLUB RD
LOVERS LN
ADAMS RD
NICHOLS DR
SMEAD HILL RD
GREEN RIVER
HINSDALE BROOK
PUNCH BROOK
MILL BROOK
MEADOW LN
PLAIN RD
BUTTERNUT ST
SILVIO O CONTE DR
GREENFIELD ST
MEADOWOOD DR
ROCKLAND RD
FACTORY HOLW
LEYDEN RD
PHYLLIS LN
PICKETT LN
ALLEN BROOK
LAKEVIEW DR
LILLIAN ST
BUNGALOW AVE
GILL RD
RT-2A
MOHAWK TRL
FRENCH KING HWY
TURNERS FALLS RD
COLRAIN RD
NEWCOMB LN
CHERRY RUM BROOK
RT-2
SUMMER ST
GOLD ST
HARRISON AVE
WILDWOOD AVE
LONG AVE
SILVER ST
NASHS MILL RD
ARMS BROOK
MOHAWK TRL
PLACE TER
CYPRESS ST
CLEVELAND ST
SHATTUCK ST
NORWOOD ST
CLARK ST
STONE RIDGE LN
LOOMIS RD
FEDERAL ST
US-5
RT-10
WARNER ST
WASHBURN AVE
LINCOLN ST
SMITH ST
HAYWOOD ST
HASTINGS ST
FOREST AVE
LINDEN AVE
ELM ST
VERNON ST
BIRCH ST
PINE ST
DAVIS ST
RIDDELL ST
BEACON ST
HIGH ST
PARKWAY ST
ABBOTT ST
POND ST
NORTH ST
SANDERSON ST
COLLEGE DR
MACKIN AVE
HOLLAND AVE
THAYER RD
HOMESTEAD AVE
COLUMBUS AVE
CONWAY ST
BEECH ST
WELLS ST
GROVE ST
PRAY DR
ARCH ST
SCHOOL ST
MAPLE ST
FREEMAN DR
UNION ST
GEORGE ST
FRANKLIN ST
CHAPMAN ST
WEST ST
PHILLIPS ST
DEVENS ST
HAYES AVE
MAIN ST
KIMBALL DR
ORCHARD ST
WHEELER BROOK
SHELBURNE RD
26
MILL ST
PROSPECT ST
MEAD ST
RIVER ST
LAUREL ST
FAIRVIEW ST W
CONGRESS ST
JAMES ST
HIGHLAND AVE
SMEAD BROOK
S SHELBURNE RD
CHAMPNEY RD
FAIRVIEW ST
PETTY PLAIN RD
WISDOM WAY
DEERFIELD ST
HOPE ST
MOUNTAIN RD
FARREN ST
LITTLE AVE
WHITE BIRCH AVE
MUNSON ST
WISDOM PL
MERIDIAN ST
BRIAR WAY
CHEAPSIDE ST
GRAVES BROOK
MONTAGUE CITY RD
DEERFIELD RIVER
N
S
W
E
0.5
0.25
0
0.5 Miles
Franklin County Massachusetts
Adopted October 18, 1989
Revised April 8, 2020
Legend
Zoning Districts
Water Bodies
Rivers & Streams
Lot Line
Former Lot Line
Former ROW Line
Lot Line / Edge of Water
Right of Way Line
Paper Street ROW
Town Boundary
Transmission Lines
Railroad
Central Commercial - CC
General Commercial - GC
General Industry - GI
Health Service - H
Limited Commercial - LC
Office - O
Planned Industry - PI
Rural Residential - RC
Semi-Residential - SR
Suburban Residential - RB
Urban Residential - RA
Public Water Supply Well
Zone I
Zone II
Zone III
Adult Entertainment Overlay District
Planned Unit Development Overlay District
Corridor Overlay District
Map Prepared by: Department of Planning & Development
Data Sources: Mass GIS & City of Greenfield
Updated April 8, 2020
GREENFIELD
MASSACHUSETTS

E. PLANNING FOR THE FUTURE

Greenfield has made strides in recent years to protect the community's character, natural resources, and to encourage development in a strategic manner. In addition to adopting an ADU Ordinance, Greenfield amended its commercial solar ordinance by requiring identification and protection of wildlife corridors in 2018 and The City completed a zoning amendment to update the Floodplain District Ordinance using the state's model, which will limit development within the floodplain and preserve the storage capacity of the City's floodplains. Further, residents of Greenfield elected to adopt the Community Preservation Act (CPA) during the 2020 election. CPA funds can be used to fund open space preservation and the development of recreation facilities.

Since the last update to Greenfield's Open Space and Recreation Plan, the City has made several efforts to increase recreation opportunities for residents. Since the last update to Greenfield's OSRP, the City has made several efforts to increase recreation opportunities for residents. Green River Park off Petty Plain Road was renovated to include a new dog park, playground, pickleball court, and pavilion. Several water fountains and refill stations were installed at various parks and fields. Additionally, a Splash Pad at Hillside Park was built with partial funding through the Commonwealth of Massachusetts' Our *Common Backyard Grant Program.* This new park provides families with a new way to cool off, which is increasingly important as Greenfield is projected to experience more days of extreme heat (days over 90 degrees) in the future. Throughout the City a number of park and school playgrounds have been updated and park identification signs were installed throughout the park system as well.

In order to continue patterns of strategic growth, Greenfield will need to find a model for growth that protects vital natural resource systems and maintains a stable property tax rate. In designing the model, it is important to understand the fiscal impact of different land uses, which can be calculated based on the relationship of property tax revenues generated to municipal services used. Although protected open space typically has a low assessed value and thus generates low gross tax revenues, municipal expenditures required to support this use are typically much lower than the tax revenue generated.

The American Farmland Trust (AFT) and other organizations have conducted Cost of Community Services (COCS) analyses for many towns and counties across the country. A COCS analysis is a process by which the relationship of tax revenues to municipal costs is explored for a particular point in time. These studies show that open spaces, while not generating the same tax revenues as other land uses, require less public services and result in a net tax gain for a community. Residential uses require more in services than they provide in tax revenues compared to open space, commercial, and industrial land uses. Communities, at the time of the study, were balancing their budgets with the tax revenues generated by other land uses like open space and commercial and industrial property. Models such as the COCS analyses should be consulted and can provide support for open space and farmland preservation, and commercial and industrial development as a way to help small cities and towns balance their budgets.[20] The studies are not meant to encourage towns and cities to implement

[20] https://masswoods.org/communityconservation

exclusionary zoning that seeks to make it difficult to develop housing, particularly for families with school age children, who require more in services.

The long-term impacts of these strategies need to be considered. Patterns of commercial and industrial uses vary considerably between towns but all communities need to consider the impact of commercial and industrial development on the overall quality of life for residents. Increased industrial development could generate jobs as well as an increased demand for housing in Greenfield. Permanently protecting a large portion of the City's open space and farmland from development could provide locally grown food and jobs, but may also jeopardize the ability for future generations to determine the best use for the land. It also can increase the cost of the remaining available land, making affordable housing development more difficult.

The best types of commercial and industrial development to encourage in Greenfield might have some of the following characteristics: locally owned and operated; in the manufacturing sector; being a "green industry" that does not use or generate hazardous materials; businesses that add value to the region's agricultural and forest products; and businesses that employ local residents. It is also important to consider that successful commercial and industrial development often generates increased demand for housing, traffic congestion and some types of pollution. Therefore, the type, size, and location of industrial and commercial development require thorough research and planning.

For Greenfield, an approach that encompasses both appropriate business development and conservation of natural resources will best satisfy the desires of residents to maintain their community character while offsetting the tax burden. By continuing to pursue growth management strategies that include active land conservation and zoning measures that balance development with the protection of natural resources, the City will be able to sustain and enhance the community's character and help to maintain a high quality of life for residents.

Greenfield can consider some of the following goals to preserve its resources, achieve recreational priorities identified by residents, and generate revenue. The following have been adapted from the 2014 Sustainable Master Plan:

- Develop priority conservation corridors and/or overlay districts and agricultural lands and rivers Inventory all agricultural land – including cropland, pastures, orchards, and its infrastructure to assess and encourage its potential preservation
- Preserve all agricultural land to increase Greenfield's food security and health for all and work toward a more sustainable agricultural system by using new innovative practices that enhance soil fertility, carbon sequestration and food production
- Increase productive agricultural land by fostering backyard gardening
- Increase biological systems into the "urban fabric" of Greenfield to provide an improved ecosystem and infrastructure
- Update the Zoning Ordinance to include sustainable development practices and controls

- Revise the Zoning Ordinance to allow development by-right in the downtown area and neighborhood centers that is compatible with Greenfield's traditional character
- Adopt an infill development ordinance to encourage redevelopment or reuse of vacant or underperforming buildings or parcels

SECTION 4

ENVIRONMENTAL INVENTORY AND ANALYSIS

This section of the Greenfield Open Space and Recreation Plan provides a comprehensive inventory of the significant natural and cultural resources in the City. The inventory identifies and qualifies the City's soils, special landscape features, surface waters, aquifers, vegetation, fisheries and wildlife, unique environments and scenic landscapes. The Environmental Inventory and Analysis provides the City with information about existing natural and cultural resources and its relationship to people that is important to understand in order to make informed land use decisions that affect the City's natural and open areas.

An analysis of each resource area is provided from two perspectives. The first perspective examines the basic ecological services and cultural amenities that the City's natural resources provide to people that live, work, and visit Greenfield. Ecological services include drinking water filtration, flood storage capacity, maintenance of species diversity, and soil nutrient levels. Cultural amenities include the recreational use of open spaces, the quality of life benefits that are maximized by maintaining the area's rural character and scenic beauty, and the direct and indirect benefits that well-conserved natural resources, such as good drinking water and open spaces, have on the local economy. The second perspective examines whether additional conservation measures should be in place to ensure that the required quality and the quantity of each resource is sustained.

CLIMATE CHANGE IMPACTS

Natural resources, including water, woodlands, wildlife and habitats, as well as urban forests, are being impacted from a changing climate in Massachusetts, and will continue to be impacted as temperatures rise and precipitation amounts and intensity change over the coming decades. According to the Massachusetts Wildlife Climate Action Tool,[21] warming is occurring in all seasons, with the greatest changes in winter, at higher latitudes, and potentially at higher elevations. Seasonal warming is extending the growing season, particularly with more frost free days occurring earlier in spring. Precipitation amounts are increasing, especially in winter. Warmer winters are also resulting in more precipitation falling as rain instead of snow, leading to reduced snowpacks - though stronger blizzards may lead to locally higher snowpacks in Massachusetts and New England. In the summer, heavier downpours combined with longer dry periods are expected, increasing the risk of both droughts and floods.

Natural resources play an important role in mitigating future climate change, but are also vulnerable to its impacts. Local decisions about how natural resources are managed and conserved will play an

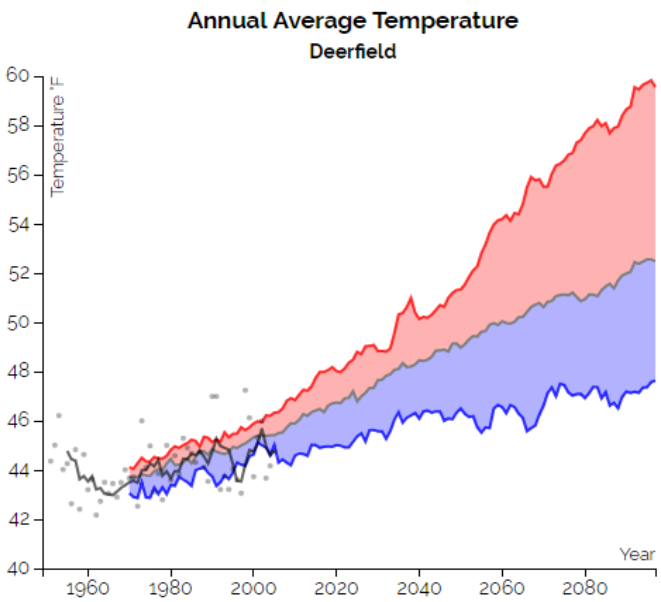
[21] http://climateactiontool.org/content/learning-about-climate-change,

important role in the ability of people, habitats, and wildlife species to cope with future climate changes. Following is an overview of the two major impacts of climate change for Massachusetts and Greenfield: changes in temperature and precipitation. More information about specific climate change vulnerabilities due to these impacts as well as adaptation strategies are incorporated into each section of the Environmental Inventory and Analysis.

A. TEMPERATURE CHANGES

The northeast United States has experienced an increase in annual temperatures of 1.6°F over the last century, with the greatest warming happening in the winter.[22] Depending on future global greenhouse gas (GHG) emissions scenarios, average annual temperatures in Massachusetts are expected to be 2.8°F to 6.2°F warmer by 2050 than in the past several decades (when the average annual temperature was observed to be 47.5°F). By 2090, the average annual temperature in the state is expected to increase by 3.8°F to 10.8°F, depending on varying emissions scenarios.[23]

Figure 4-1: Observed and Predicted Change in Annual Average Temperature, 1971-2090



Source: Resilient MA: Climate Change Clearinghouse for the Commonwealth.

In the Deerfield River Watershed, where the majority of Greenfield lies, annual temperatures in the watershed are expected to increase between 2.3°F and 6.9°F by 2050 depending on future GHG emissions levels (Figure 4-1). By 2090, average annual temperatures in the watershed could increase by 2.9°F to as much as 14.2°F depending on global emissions.[24] In addition to overall warming temperatures, it is expected that an increase in extreme high temperatures will occur. For example, in Massachusetts there will be between 7 to 26 more days over 90°F in 2050 compared to the past several decades. In the Deerfield River Watershed, it is expected that by 2050, there will be anywhere from 4 to 40 more days with temperatures over 90°F. From 1970 to the mid-2000s, the watershed averaged less than 5 days per year when temperatures reached over 90°F.[25]

[22] Massachusetts Wildlife Climate Action Tool, http://climateactiontool.org/content/temperature-changes.

[23] Resilient MA: Climate Change Clearinghouse for the Commonwealth, http://www.resilientma.org. Accessed on August 29, 2018.

[24] Ibid.

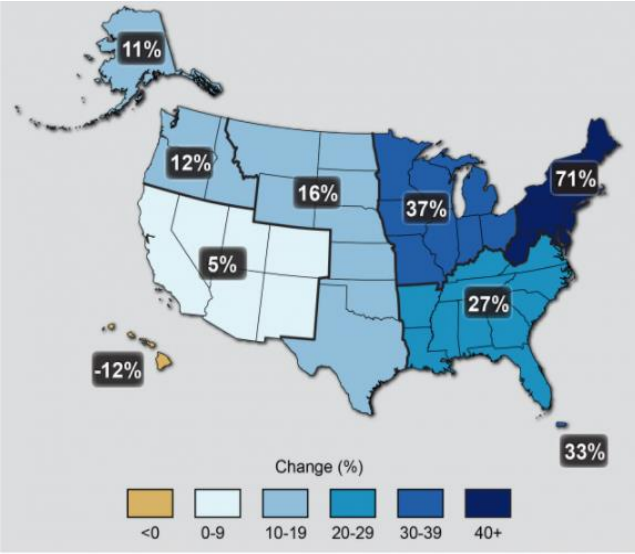
[25] https://resilientma.org/map/. Accessed January 2021.

Conversely, the watershed is expected to experience fewer days when temperatures drop below freezing (32°F).

B. PRECIPITATION CHANGES

In Massachusetts, annual precipitation amounts have increased at a rate of over 1 inch per decade since the late 1800s, and are projected to continue to increase largely due to more intense precipitation events. The Northeast has experienced a greater increase in extreme precipitation events than the rest of the U.S. in the past several decades (Figure 4-2).

Figure 4-2: Observed Change in Very Heavy Precipitation, 1958-2012



The northeast has seen a greater increase in heavy precipitation events than the rest of the country. Source: updated from Karl et al. 2009, Global Climate Change Impacts in the United States.

Observed annual precipitation in Massachusetts for the last three decades was 47 inches. Total annual precipitation in Massachusetts is expected to increase between 2% to 13% by 2050, or by roughly 1 to 6 inches. In the Deerfield River Watershed, annual precipitation has averaged around 45 inches in recent decades. By 2050, the annual average could remain relatively the same (but occur in more heavy, short intervals) or increase by up to 12 inches a year under a high greenhouse gas emissions scenario. In general precipitation projections are more uncertain than temperature projections.[26]

Although overall precipitation is only expected to slightly increase, a primary concern is that the Northeast will receive more precipitation during heavy, concentrated events, followed by periods of drought. Changes in precipitation patterns, especially prolonged periods of drought, can negatively affect agriculture, forests, and natural ecosystems.

C. EFFECTS OF CLIMATE CHANGE

Climate change is already altering natural habitats and impacting communities in various ways. Ecosystems that are expected to be particularly vulnerable to climate change include coldwater streams and fisheries, spruce-fir forests, hemlock forests, northern hardwood forests, vernal pools and street trees in town and city centers. Warming temperatures and changes in precipitation will push plant and

[26] https://resilientma.org/map/. Accessed January 2021.

animal species northward or to higher elevations. Higher temperatures, along with changes in stream flow, will degrade water quality. Coldwater aquatic fish species will decline, while an increase in stronger storms will lead to more flooding and erosion. A shift to winter rains instead of snow will potentially lead to more runoff, flooding, and greater storm damage along with less spring groundwater recharge.

An increase in extreme weather events, including heavy rains, ice storms, microbursts and hurricanes, will affect natural resources and human communities. Loss of roads, bridges, culverts, buildings, farmland and crops are a few impacts that have already been experienced in the region from increased extreme weather. Sea level rise and more extreme storms on the coast may not directly affect Greenfield, but may begin to push some of the millions of people living along the north Atlantic seaboard to move inland, placing development pressure on rural areas.

While climate change will continue to be a major challenge globally, local efforts and decisions have real and lasting impacts on mitigating and adapting to future climate change. One of the most effective, and least costly, strategies is to preserve existing natural areas and manage them- or leave them to manage themselves - for increased resilience to climate change.

B. DOCUMENTING AND MAPPING ECOSYSTEMS

Just as the City of Greenfield contains multiple and varied ecosystems, the state of Massachusetts, while relatively small, has many diverse ecosystems and habitats. Documentation and mapping of such ecosystems and habitats – and their contributions to biodiversity and climate change resilience – can be a first step toward protecting and preserving these resources.

B.1 BIOMAP2

In 2010, the Massachusetts Department of Fish and Game and The Nature Conservancy launched BioMap2: Conserving the Biodiversity of Massachusetts in a Changing World. This project, produced by the Natural Heritage and Endangered Species Program (NHESP), is a comprehensive biodiversity conservation plan for Massachusetts, and endeavors to protect the state's biodiversity in the context of projected effects of climate change.[27]

BioMap2 combines NHESP's 30 years of rare species and natural community documentation with the Division of Fish and Wildlife's 2005 State Wildlife Action Plan (SWAP). It also integrates The Nature Conservancy's assessment of ecosystem and habitat connections across the State and incorporates ecosystem resilience in the face of anticipated impacts from climate change. BioMap2 data replace the former BioMap and Living Waters data.

BioMap2 data focuses primarily on state-listed rare species and exemplary natural communities and was developed to guide strategic biodiversity conservation in the state by focusing land protection and

[27] http://maps.massgis.state.ma.us/dfg/biomap2.htm.

stewardship efforts. Core Habitat areas include the most viable habitat for rare plants and rare animals and exemplary natural communities. Critical Natural Landscapes include buffer areas around the Core Habitats, large undeveloped patches of vegetation, large "roadless" areas, and undeveloped watersheds. The Core Habitat areas were identified, through field surveys, as supporting viable populations of rare plant and animal species while the Critical Natural Landscape areas were determined through analyses using Geographic Information Systems (GIS) mapping programs. BioMap2 Core Habitat and NHESP Priority Habitats for Rare & Endangered Species are shown on the *Plant & Wildlife Habitat* Map.

NHESP BioMap2 Core Habitat and Critical Natural Landscapes (CNL) in Greenfield can be summarized as follows[28] and are displayed on the Plant & Wildlife Habitat map in this section:

- 18% of the land classified as BioMap2 Core Habitat in Greenfield is protected.
- 15% of the land classified as BioMap2 Critical Natural Landscape in Greenfield is protected.
- The largest patches of BioMap2 Core Habitat in Greenfield are located along the stretch of the Green River north of Interstate 91 to the City's border with Leyden and in Rocky Mountain Park and Temple Woods.
- A large area of BioMap2 Critical Natural Landscape is located in the northeast region of the City and extends east into Gill. This CNL primarily is made up of hardwood forest.
- Hinsdale Brook and Punch Brook (tributaries of the Green River) represent a stretch of Aquatic Core habitat stretching from central to west Greenfield. Both brooks are buffered by BioMap2 Critical Natural Landscapes that help link Core Habitat to far reaching landscapes in Leyden and Bernardston.
- The Glen Brook represents another important stretch of Aquatic Core Habitat, which runs from Leyden to the Green River. Glen brook is also buffered by Core Habitat and Critical Natural Landscapes.
- A stretch of the Deerfield River along Greenfield's southern border to its confluence with the Connecticut River is designated as Aquatic Core Habitat and is buffered by Core Habitat and Critical Natural Landscapes. The Core Habitat in this region connects to landscapes in neighboring towns along the Connecticut River.
- A small stretch of the Mill Brook in northeastern Greenfield is designated as Aquatic Core Habitat and is buffered by a Critical Natural Landscape.
- A 31-acre section of land along the Green River in central Greenfield is designated as a Core Habitat.

B.2 NHESP PRIORITY HABITATS

Priority and Estimated Habitats is a program administered by NHESP. Identification and mapping of Priority and Estimated Habitats is based on the known geographical extent of habitat for all state-listed rare or endangered species, both plants and animals, and is codified under the Massachusetts

[28] 2010 BioMap2 data, https://docs.digital.mass.gov/dataset/massgis-data-biomap2

Endangered Species Act (MESA). Habitat alteration within Priority Habitats is subject to regulatory review by the Natural Heritage & Endangered Species Program. Priority Habitat maps are used for determining whether or not a proposed project must be reviewed by the NHESP for MESA compliance.

The 14th edition of the NHESP Natural Heritage Atlas (effective August 2017)[29] displays the boundaries of Priority Habitat of Rare Species for the entire City of Greenfield. A Priority Habitat is an area where plant and animal species that are protected by the Massachusetts Endangered Species Act regulations may occur. According to the 2017 Atlas, NHESP Priority Habitats in Greenfield occur:

- Along the full extent of the Green River and Glen Brook within City boundaries
- Along a section of the Mill Brook from north of Interstate 91 to south of Barton Road
- Along the Deerfield River and Connecticut River on the City's southern and eastern borders
- In Rocky Mountain Park and Temple Woods

These areas are shown on the Plant & Wildlife Habitat map.

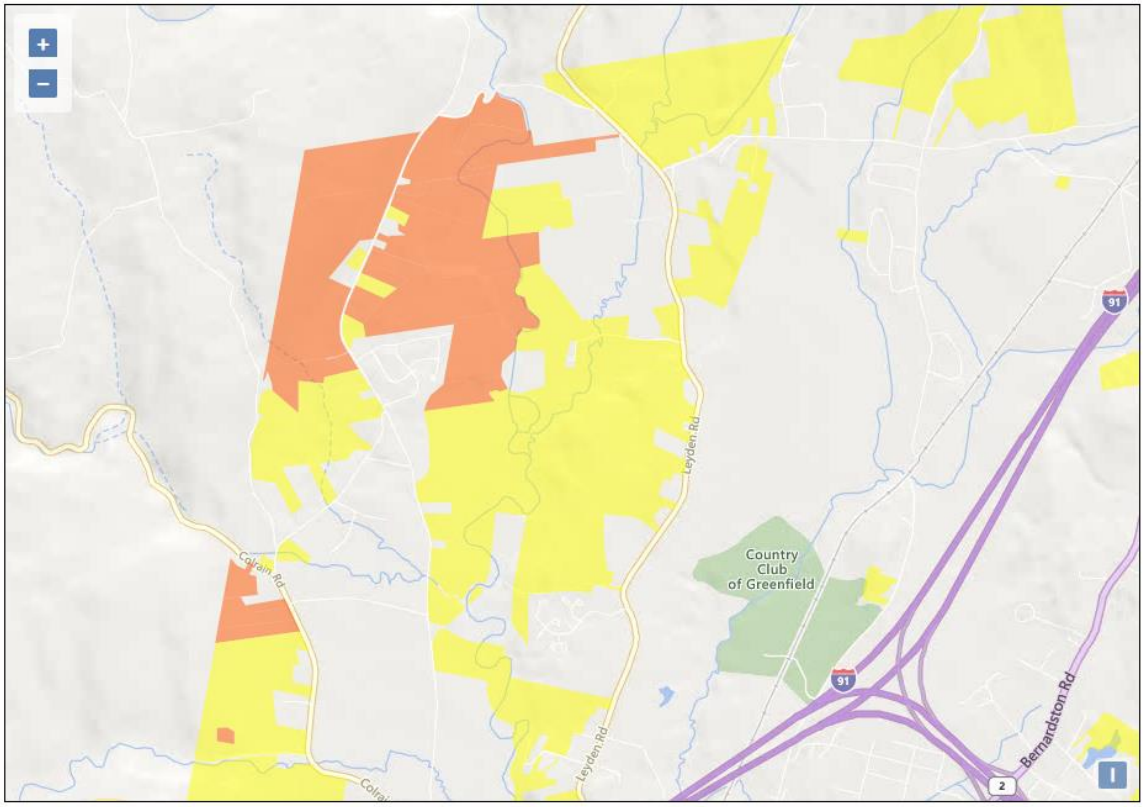
B.3 MASSAUDUBON'S MAPPING AND PRIORITIZING PARCELS FOR RESILIENCE (MAPPR)

Mass Audubon, in partnership with The Nature Conservancy and LandVest, developed Mapping and Prioritizing Parcels for Resilience (MAPPR) to allow Massachusetts conservationists to rapidly identify specific parcels that, if protected, could contribute the most to achieving land protection goals. MAPPR compiles the previous work of BioMap2 and TNC's Resilient Sites, along with other digital parcel information into one online mapping tool.

Mapping and Prioritizing Parcels for Resilience (MAPPR) allows land conservationists to identify the parcels within an area of interest that are the highest priorities for protection based on habitat quality, climate change resilience, and other metrics such as parcel size and adjacency to existing protected parcels. The higher the number and darker the color, the more critical that parcel is for conservation based on selected inputs. The tool can be accessed for free at MassAudubon's website here: https://www.massaudubon.org/our-conservation-work/advocacy/shaping-the-future-of-your-community/current-projects/mappr-project

[29] https://www.mass.gov/service-details/regulatory-maps-priority-estimated-habitats

Figure 4-1: An Example of a Map Created Using MassAudubon's MAPPR Tool



B.4 SUMMARY OF MAPPED ECOSYSTEMS IN GREENFIELD

On the statewide level, mapping Core Habitat and Critical Natural Landscapes helps to guide strategic conservation to protect those areas that are most critical to the long-term survival and persistence of rare and other native species and their related habitats and ecosystems. On the local level, Greenfield can use this information to better understand where the City's ecosystems and habitats fit into the bigger picture. For example, a small parcel of land could be a key link to two larger, intact ecosystems, and should then be prioritized for conservation. These analyses could help City leaders to identify which parcels of land may be of highest priority for conservation when they come up for right of first refusal under any of the Chapter 61 programs.

On an individual landowner level, *BioMap2* – as well as NHESP Priority and Supporting Habitats – is an important tool that can be used to apply for grants to help improve, manage and monitor certain lands. An example is the MassWildlife Habitat Management Grant Program, which helps fund efforts to enhance wildlife habitat and increase recreational opportunities on private properties, with preference given to land that is classified as, or located nearby, NHESP areas.

DRAFT

LEYDEN

BERNARDSTON

COLRAIN

SHELBURNE

GILL

MONTAGUE

DEERFIELD

Greenfield Reservoir

NEWELL POND

The Cascades

Barton Cove

Barton Island

Rawson Island

Spead Island

The Narrows

Connecticut River

Deep

Fall River

Green River

Glen Brook

Mill Brook

McCaffrey Brook

Punch Brook

Hinsdale Brook

Allen Brook

Arms Brook

Check Rum Brook

Spead Brook

Wheeler Brook

Sheldon Brook

Fall Brook

White Ash Swamp

Canada Hill

Poet's Seat

Sachem Head

Pine Hill

Woodman Hill

Rocky Ridge

Arthurs Seat

Shelburne Mountain

Shearer Hill

Greenfield Meadows

North Meadow

Mountain Road

Bridge Street

Main Street

Federal Street

Chapman Street

Davis Street

School Street

Maple Street

High Street

Deerfield Street

Washington Street

Hope Street

Briar Way

Cheapside Street

Bank Row

Prospect Street

Crescent Street

Orchard Street

Parkman Street

Highland Avenue

James Street

Peabody Lane

Park Avenue

Montague City Road

Meridian Street

Munson Street

Laurel Street

Fairview Street

Petty Plain Road

Wisdom Way

Newton Street

River Street

Mill Street

Meadow Street

Vernon Street

Birch Street

Wells Street

Beech Street

Elm Street

Columbus Avenue

Grove Street

West Street

Phillips Street

Devens Street

Kimball Drive

Woodard Road

Old Rain Street

Conway Street

Cleveland Street

Shattuck Street

Norwood Street

Kenwood Street

Forest Avenue

Pierce Street

Lincoln Street

Smith Street

Haywood Street

Hastings Street

Riddell Street

Beacon Street

Madison Circle

Maple Street

Oak Street

Summer Street

Gold Street

Cherry Street

Oakland Street

Ferrante Avenue

Harrison Avenue

Silver Street

Wildwood Avenue

Eliza Lane

Turners Falls Road

High Street

Poet's Lane

Mountain Road

Spead Island

Rawson Island

Fall River

Graves Road

Wayland Drive

Scout Road

Adams Road

Covers Lane

Silvio O. Conte Drive

French King Highway

Route 2

Gill Road

Canada Hill

Overland Road

Burnham Road

Bernardston Road

Country Club Road

Interstate 91

Mohawk Trail

Leyden Woods Lane

Leyden Road

Pickett Lane

Plain Road

Meadow Lane

Smead Mill Road

Farm Road

Lunt Drive

Sauter Lane

Arnold Lane

Nashs Mill Road

Colrain Road

College Drive

Homestead Avenue

Thayer Road

Shelburne Road

South Shelburne Road

Old Albany Road

Old Stage Road

Graves Road

Wayland Drive

Barton Road

Oak Hill Road

Oak Hill Acres

Avenue Brook

West Log Plain Road

Severance Street

Bernardston Road

Fargo Drive

East Log Plain Road

Mill Brook Road

Barton Heights

Lamplack Road

Bascom Road

Green River Road

Lunt Drive

Sauter Lane

Arnold Lane

Bernice Williams Drive

Health Camp Road

Barton Road

Oak Hill Road

Oak Hill Acres

Avenue Brook

West Log Plain Road

Severance Street

Bernardston Road

Fargo Drive

East Log Plain Road

Mill Brook Road

Barton Heights

Lamplack Road

Bascom Road

BioMap2

- Core Habitat
- Critical Natural Landscape
- Wetland
- Priority Habitats for Rare & Endangered Species*
- Certified Vernal Pool*
- Road
- Rail Line
- River, Stream
- Water Body

*Natural Heritage & Endangered Species Program

City of Greenfield
Franklin County Ma.

Sources: Map produced by the Franklin Regional Council of Governments Planning Department. GIS data sources include MassDOT, MassGIS and FRCOG. Depicted boundaries are approximate and are intended for planning purposes only, not to be used for survey.

City of Greenfield Open Space & Recreation Plan 2021

Plant & Wildlife Habitat

0 0.5 1 Miles

N

frcog Franklin Regional Council of Governments

B. TOPOGRAPHY, GEOLOGY, AND SOILS

Decisions relating to open space and recreation planning should take into consideration the inherent suitability of a site for different uses. Topography, geology, and soils are essential in determining potential sites for future residential, commercial and industrial development as well as for new parks, hiking trails, and open space.

B.1 TOPOGRAPHY & GEOLOGY

Greenfield is located in the Connecticut River Valley lowland region, which has ideal agricultural soils that have contributed to the rich farming history of the City. Greenfield's topography is characterized by large expanses of relatively flat floodplain terrain framed by forested hills and ridgelines. The wooded uplands that form Greenfield's western boundary also define the western edge of the Connecticut River Valley. The southwest corner contains the highest local elevations, approximately 870 feet above sea level, on Shelburne Hill and Greenfield Mountain.

The river valley in Greenfield reaches nearly three miles wide and seven miles long. Five hundred million years ago, this valley was an inland sea. Two hundred million years ago, the sea floor settled and gradually filled with sediment, and erosion filed the mountains down. The trap-rock ridge was formed when a long crack opened in the basin and black lava pushed up in a series of basalt sheets, which extended from approximately Northfield, MA, to Old Saybrook, CT. Greenfield's Rocky Mountain Ridge is a result of this activity.

Rocky Mountain, on the City's eastern boundary, separates the developed portion of the City from the Connecticut River. The highest elevation on this ridge is 490 feet. From the ridge there are views overlooking downtown Greenfield to the west, and views of the Connecticut River and Turners Falls to the east. North of Route 2 steep slopes join the flat narrow valley of the Fall River characterizing the western border of Greenfield. The northeastern portion of the City features many glacially formed hills with elevations ranging from 500 to 550 feet. The remaining land is open and relatively flat, particularly in the Greenfield Meadows/Green River area northwest of I-91. The urbanized area of the City, between I-91 and Rocky Mountain, has been developed on relatively flat topography. The Mohawk Trail/Route 2 gateway to the Town of Shelburne features steep slopes overlooking the Green and Deerfield Rivers.

Greenfield is located within the Pioneer Valley, a region considered to have some of the best agricultural soils in New England, as well as the entire United States. These prime soils are the result of years of soil deposits from the Connecticut River and its tributaries. Fertile farm land drew settlers to the Greenfield area, and though their numbers have dwindled there are still a number of working farms in the City.

B.2 SOILS

Soils have five basic characteristics: their depth to bedrock; the speed at which they allow water to percolate into the ground; their slope; the amount of surface water that exists in the area; and the amount of boulders and stones present on the surface that make them appropriate or inappropriate for different land uses.

As Greenfield plans for the long-term use of its land, at least four soil related questions arise: Which soils constrain development given current technologies? Which soils are particularly suited for recreational opportunities and wildlife habitat? Which soils and substrates impact current and future drinking water supplies? And finally, which soils are best for agriculture? The answers to these questions will help lay the foundation for open space and recreation planning in Greenfield.

Table 4-1 below describes the ten predominant soil types in Greenfield and provides information about where they are located, in addition to if the soil type constrains development, or if they are well suited for recreational activities, wildlife habitat, woodland, or agricultural uses. The following narrative describes the soils in Greenfield and their uses for agriculture, drinking water, wastewater, recreation, and wildlife habitat. The City's soils are also shown on the USDA-NRCS Soil Composition Map.

Table 4-1: Soil Types in Greenfield, Massachusetts

General Soil Area	Location	Acres	%	Severe Use Limitations (o) / Best Suited Uses (✓)					
				Development	Agriculture	Recreation	Woodland	Wildlife Habitat	Pasture
Westminster-Cheshire-Shelburne	Western Greenfield	1,380	10%	o	o				
Hadley-Ondawa-Winooski	Floodplain of the Green River, southeast Greenfield on the western banks of the Connecticut River	410	3%		✓				
Warwick-Walpole-Merrimac	Nearly level to gently sloping land in the north central portion of the City and on the eastern border north of Route 2	3,300	24%				✓	✓	✓
Nassau-Dutchess-Bernardston	Relatively small areas near the City's northern border	410	3%			✓	✓		
Hollis-Charlton	An area bordering the Fall River on slopes between 15-30%	280	2%	o		✓	✓		
Merrimac-Agawam-Sudbury	Along the Green River floodplain and at the base of Shelburne Hill and Greenfield Mountain	1,930	14%	o		✓			
Melrose-Buxton-Scantic	East of Interstate Highway 91 and extend north of Interstate Highway 91 on the eastern side of Leyden Road	1,240	9%		✓		✓		

General Soil Area	Location	Acres	%	Severe Use Limitations (o) / Best Suited Uses (✓)					
				Development	Agriculture	Recreation	Woodland	Wildlife Habitat	Pasture
Merrimac-Hinckley	South central portion of the City and in the central, urbanized area surrounding Federal Street	2,340	17%	✓					
Holyoke-Sunderland-Cheshire	The steep Rocky Mountain ridge area, a small central area near the intersection of I-91 and the Route 2 bypass, and in the wooded, hilly area north of Route 2 and east of I-91	2,060	15%	o		✓	✓		
Windsor-Peat-Scarboro	A small section of depressed land in an area of the Route 2 bypass	410	3%	o			✓	✓	

Source: Greenfield Sustainable Master Plan, 2014

B.2.1 SOILS CONSTRAINING DEVELOPMENT GIVEN CURRENT TECHNOLOGIES

Of the ten predominant soil types found in Greenfield, five soil types have severe limitations for development. The western portion of the City, the area bordering the Fall River, and the Rocky Mountain Ridge area include areas with soils that constrain development such as the Westminster-Cheshire-Shelburne, Hollis-Charlton, and Holyoke-Sunderland-Cheshire associations. These soils are all found in areas of the City with steep slopes and are typically shallow to bedrock.

The Merrimac-Agawam-Sudbury and Windsor-Peat-Scarboro soil associations also constrain development, and are found parallel to the Green River floodplain, at the base of Shelburne Hill and Greenfield Mountain, and a small section of depressed land near the Route 2 bypass. These soils are excessively drained and better suited for agricultural uses or wildlife habitat.

B.2.2 SOILS SUITED FOR RECREATIONAL ACTIVITIES AND/OR WILDLIFE HABITAT AND WOODLANDS

Different recreational uses are constrained by separate soil and topographical characteristics. Sports fields require well-drained and level soils. Lands with slopes over 25 percent may be attractive to biking and hiking enthusiasts but only if the soils are not easily eroded. Erodible soils include those that are shallow, wet, sandy, or sloped or those with a combination of these characteristics. Depending on the combination of factors, highly erodible soils could have less than 15 percent slopes. Soils best suited for recreation in Greenfield are in the Rocky Mountain Ridge area, and an area along the Fall River.

Soils that best support a variety of wildlife habitats and woodlands include the shallow and fine, sandy Warwick soils, and the poorly drained Walpole and Melrose soils found in gently sloping land in Greenfield. Greenfield might consider identifying and protecting the areas surrounding such hydric or very wet soils. More than likely these soils provide for a diverse array of wetland species habitats. In addition, protecting any remaining high slope areas along ridge tops would protect habitats for large mammals as well as scenic views. Finally, protecting ridge tops and wetlands for wildlife habitat is not sufficient in and of itself. The City should also assess lands that link these special areas to allow for the movement of animals along corridors between the habitats, both currently and in the future in response to climate change.

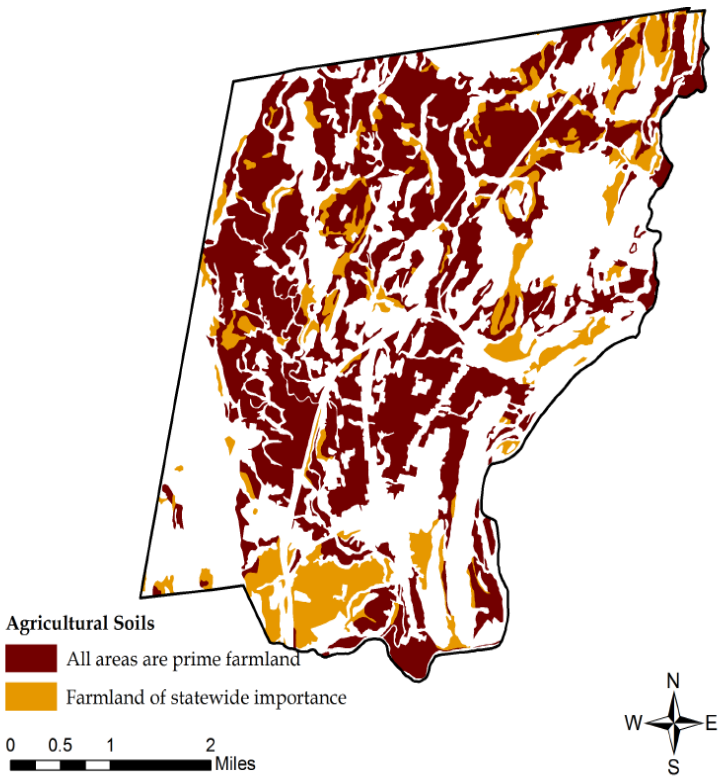
B.2.3 SOILS SUITABLE FOR AGRICULTURE

The Natural Resources Conservation Service (NRCS) is responsible for classification of soils according to their suitability for agriculture. NRCS maintains detailed information on soils and maps of where they are located. Designated farmland soils are comprised of three classes of soils that have been identified by the NRCS:

- Prime Farmland
- Unique Farmland, and
- Farmland of statewide or local importance.

These soil classes have been identified as contributing to the agricultural productivity of the country and should be protected from conversion to non-agricultural uses. NRCS defines prime farmland as the land with the best combination of physical and chemical characteristics for producing food, feed, forage, fiber and oilseed crops and that is available for these uses. Prime soils produce the highest yields with the fewest inputs, and farming in these areas results in the least damage to the environment. Unique farmland is land other than prime farmland used for the production of high-value food and fiber crops, with such crops defined by the Secretary of Agriculture. Farmland of statewide or local

Figure 4-2: Greenfield's Agricultural Soils



Source: Mount Grace Land Conservation Trust

importance is defined as “farmland, other than prime or unique farmland, that is of statewide or local importance for the production of food, feed, fiber, forage, or oilseed crops.” These agricultural soils are a finite resource. If the soil is removed, or the land is developed, the capacity for food and fiber production is permanently lost.

There are approximately 6,566 acres of prime farmland soils in the City of Greenfield. This constitutes 31 percent of the land area in the City. However, only about 1,313 acres of prime farmland soils is actually being used for cropland or pasture. Most of the prime farmland soils have been reforested since the 1800s.[30] The larger parcels of prime agricultural land can be found in the northwest portion of Greenfield in the areas known as the Upper and Lower Meadows. These areas are home to many of the City’s Farms, including the approximately 60-acre Greenfield Community Farm, a project of Just Roots.

The characteristics that make prime farmland soils suitable and valuable for agricultural also make them easy to develop. Large tracts of level, well-drained farmland are attractive to developers because infrastructure (such as roads and water hookups) often already exists or has a relatively low cost to install or improve for residential use. The City may want to consider all soils currently in use for agriculture to be rare, valuable, and vulnerable to development. In this case, the City should consider the protection of these soils and the farm businesses that sustain them when enacting land use bylaws and other land use actions. Additionally, the value of farmland in Greenfield may increase as food production becomes more challenging in other parts of the country due to climate change. Landowners may want to consider temporary or permanent forms of land protection as well as farm assistance programs to help them keep this land in active agriculture.

[30] MassGIS 2005 land use and prime and statewide important farmland soils datalayers. From analysis conducted by Mount Grace Land Conservation Trust, 2016.

DRAFT

COLRAIN

LEYDEN

BERNARDSTON

SHELBURNE

GILL

MONTAGUE

DEERFIELD

- Hollis-Chatfield complex
- Woodbridge loam
- Fine Sandy, Very Fine Sandy or Loamy Sand Loam
- Sandy Loam
- Windsor and Merrimac soils
- Silt Loam
- Mucky Silt Loam / Muck
- Gravel
- Nassau-Cardigan-Rock outcrop complex
- Peat
- Riverwash
- Udorthents, refuse substratum, or Smoothed
- Urban land complex
- Water
- 3 Meter Contour

City of Greenfield
Franklin County Ma.

Sources: Map produced by the Franklin Regional Council of Governments Planning Department. GIS data sources include MassDOT, MassGIS and FRCOG. Soils- US Department of Agriculture, Natural Resources Conservation Service 2011.Depicted boundaries are approximate and are intended for planning purposes only, not to be used for survey.

City of Greenfield Open Space & Recreation Plan 2021

USDA- NRCS Soil Composition

0 0.5 1 Miles

N

Franklin Regional Council of Governments

B.3 TOPOGRAPHY, GEOLOGY, AND SOILS ANALYSIS

It is clear from the above analysis that within Greenfield, the geology, topography, and soils provide both ecological services (such as crop production and water purification) and cultural amenities (such as scenic views and hiking trails). The ecological services and cultural amenities that Greenfield's ridgelines, hills, woodlands, and soils provide cannot be replaced. They will be diminished, however, with neglect and poor planning. Exploring ways to conserve prime farmland soils will be required if residents want to sustain Greenfield's rural character and the City's local recreational and agricultural economy.

As detailed in the *Community Setting* section, the City has enacted zoning bylaws that work to steer new development into existing urban areas, balance new development in rural areas with the permanent protection of farmland, increase opportunities for the preservation and continued agricultural use of productive farmland, to preserve land with prime agricultural soil conditions, and to preserve the scenic qualities of the City.

C. LANDSCAPE CHARACTER

The landscape of Greenfield has played a significant role in defining the character of the City. The Green, Fall, and Deerfield Rivers are of particular scenic interest and they provide recreation opportunities such as swimming, fishing and boating to Greenfield residents. The numerous river corridors in Greenfield need to be explored as potential recreational assets and as areas to protect and preserve. More planning needs to be performed to determine the most ideal recreational opportunities for residents to enjoy and while assessing the potential environmental impacts . These corridors create part of Greenfield's unique character, and any planning should be done to promote, not destroy, Greenfield's natural resources.

Additionally the bikeway in Greenfield, constructed along the Green River from Nash's Mill Road to Riverside Drive, is a scenic bike trail is an asset to the cycling community. The Franklin County bikeway network also consists of a shared roadway which travels through the outskirts of downtown Greenfield into Gill along the Green River. After flooding devastated a mobile home community (the Wedgewood Gardens Trailer Park) adjacent to the Green River, the City acquired the property, through state and federal grants, which was renamed Millers Meadow. This area was the key to such an extension to the bikeway. Millers Meadow, now used primarily as an informal dog-walking area, could be improved through invasive plant species removal, riverbank stabilization and attention to other environmental needs at the site.

The mountain ridges that encircle Greenfield offer scenic views and recreational opportunities. One main point of interest built to capture such views is the Poet's Seat Tower on Rocky Mountain. The low profile of the Rocky Mountain ridge to the east can be observed from Shelburne Mountain and Greenfield Mountain. To the west, views of downtown Greenfield and the fertile fields of the Western Upper and Lower Meadows can be seen from the Poet's Seat Tower, Sacchem's Head, or at many vistas

along the Rocky Mountain Ridge. In addition, the Connecticut River Valley to the South can be spotted atop Poet's Seat and along the Rocky Mountain Ridge. There are other vistas located along the ridgeline hiking trails, which take advantage of Greenfield's scenic resources as well. Some of the ridgelines on the west (upper and lower meadows) and pieces of the Rocky Mountain ridge on the east are currently unprotected and are valued as scenic views. Development in these areas would limit public access to the numerous magnificent vistas from these high elevations. Preservation of these areas should be prioritized.

D. WATER RESOURCES

Greenfield is rich in water resources, including brooks, streams, ponds, vernal pools, wetlands, and aquifers (See the Water Resources Map). This section focuses on waters within the City of Greenfield, but it is important to keep in mind that improvement in water quality of the brooks and streams in the City have impacts beyond Greenfield's borders.

D.1 WATERSHEDS

As described in Section 3, land in the City is part of the Deerfield River watershed and the Connecticut River watershed. There are many small subwatersheds throughout Greenfield, such as Smead, Allen, Mill, and Glen Brook subwatersheds. The Deerfield River Watershed and the Green River Watershed are important sub-watersheds within the Connecticut River Watershed.

Connecticut River Watershed

The Connecticut River watershed consists of approximately 11,000 square miles and includes portions of Massachusetts, New Hampshire, Vermont and Connecticut. The Connecticut River flows for approximately 410 miles, beginning at the Canadian border and emptying into the Long Island Sound. According to the Connecticut River Conservancy, 80% of the watershed is forested, 12% agricultural, 3% developed and 5% water. Thirty-eight tributaries flow into the Connecticut River, totaling over 20,000 miles of streams in the watershed.

The Connecticut River watershed is home to many species including nine federally listed endangered, threatened, or candidate species. These include the piping plover, shortnose sturgeon, dwarf wedge mussel, puritan tiger beetle, Jesup's milk-vetch, Robbin's cinquefoil, small whorled pogonia, and the northeastern bullrush. (The bald eagle (2007) and the peregrine falcon (1999), have been de-listed due to recovery of the species.)[31]

Deerfield River Watershed

[31] U.S. Fish and Wildlife Service, Silvio O. Conte National Fish and Wildlife Refuge website, https://www.fws.gov/refuge/Silvio_O_Conte/wildlife_and_habitat/endangered.html, accessed March 2021.

The Deerfield River Watershed covers an area of 665 square miles, and is home to one of the coldest and cleanest rivers in Massachusetts. It originates in the Green Mountains of southern Vermont, flowing approximately 70 miles and dropping roughly 2,000 feet before draining into the Connecticut River in Greenfield. The river enters Massachusetts between the Towns of Monroe and Rowe in Franklin County and flows southeastward through the Berkshire Hills in a narrow valley characterized by beautiful scenery, steep slopes and rural village centers. As the Deerfield approaches its confluence with the Connecticut, the river valley becomes wider and more developed, including the rich agricultural fields of the Town of Deerfield and the urban center of Greenfield.

While there is very little development in the Deerfield River Watershed, decades of natural and human-caused disturbances, such as land clearing and channel modification, have made streams and rivers highly unstable and prone to frequent flooding and erosion. Climate change and continued development in the floodplain also contribute to significant stress on the river systems of the Watershed. [32]

In 2017, FRCOG released *The Deerfield River Watershed-Based Plan*[33], which outlines evidence-based recommendations to protect watershed health, restore impaired water bodies, and increase the watershed's resiliency to climate change. This plan focused on ways that towns can become more resilient by working across municipal boundaries to address shared issues and implement mutually beneficial solutions at watershed scale. The plan outlines a wide range of stewardship and management recommendations for public and privately owned forests and agricultural land. Many of these recommendations are relevant to, and support of, goals and action items identified in the 2021 OSRP. They include:

- Update and align land use regulations across the 14 watershed towns, with a focus on mapping and managing the river corridor,
- Identify sediment storage, water quality protection and conservation opportunities in the upland areas of the watersheds, and
- Conduct conservation and restoration projects that protect green infrastructure, improve flood resiliency and reduce sediment inputs to streams and rivers.

The plan also outlines more specific landscape scale, conservation and protection, and river corridor and floodplain recommendations that can be implemented throughout the Deerfield River Watershed and can involve many watershed communities and a variety of stakeholders. These recommendations are intended to protect and restore watershed health and engage and educate watershed residents.

Green River Watershed

The 32,649-acre Green River-Thorne Brook to Mouth subwatershed contains the City

[32] *A Framework for Resilience: Responding to Climate Change in the Deerfield River Watershed.* Franklin Regional Council of Governments, January 2019.

[33] A Watershed-Based Plan to Maintain the Health and Improve the Resiliency of the Deerfield River Watershed, 15-04/319. Franklin Regional Council of Governments. 2017.

of Greenfield and portions of the towns of Bernardston, Leyden, and Shelburne. Not only is this subwatershed the most developed, it also has the second highest amount of agricultural land within the Deerfield River Watershed. Because of the flatter topography in the southern half of the subwatershed, much of this area is considered to be part of the stream corridor as defined by The Nature Conservancy's Active River Area. Due to historical development patterns, almost all of the City of Greenfield is located within this Active River Area. Three major roadways pass through the subwatershed: Interstate 91, Route 2, and Route 5/10. Four miles of the lower Green River is listed as a Category 5 Water, requiring a TMDL for fecal coliform. The source of the fecal coliform has not yet been identified, but potential sources include stormwater runoff, aging sewer and stormwater infrastructure (particularly the Maple Brook Culvert in the City of Greenfield), septic systems and discharges from the Greenfield Water Pollution Control Plant. In addition, there is a DEP-approved Zone II Recharge Area on the eastern boundary of the subwatershed, protecting a drinking water supply.

D.2 SURFACE WATER

The following inventory describes Greenfield's rivers, streams, brooks, and ponds and focuses on water quality issues and the public access and recreational value of these waters. The Masachusetts Year 2016 Integrated List of Waters prepared by the Department of Environmental Protection (DEP), and the BioMap2 Greenfield Town Report, are used as source documents for all listed surface waters within the City of Greenfield.[34] Not all water bodies in Greenfield have been assessed by the DEP for water quality impairments.

The Massachusetts Surface Water Quality Standards (SWQS)[35] assign all inland and coastal and marine waters to classes according to the intended beneficial uses of those waters. For example Class A waters are designated as the source of public water supplies and, where compatible with this use, should also be suitable for supporting aquatic life, recreational uses such as swimming and boating, and fish consumption. Class B waters are not water supplies, but are designated for all of the other uses cited above for Class A. Finally, Class C waters should be suitable for aquatic life and recreational uses where contact with the water is incidental, such as boating and fishing, but may not be suitable for swimming, diving, or water skiing.

A TMDL is the greatest amount of a pollutant that a water body can accept and still meet water quality standards for protecting public health and maintaining the designated beneficial uses of those waters

[34] The State is required by the United States Environmental Protection Agency to identify water bodies that are not expected to meet surface water quality standards after the implementation of technology-based controls. In each case, the most severe pollutant is identified. Although the affected water bodies may contain other pollutants, the Integrated List of Waters only includes the results of evaluations upon which DEP has performed some measure of quality control.

[35] https://www.epa.gov/sites/production/files/2014-12/documents/mawqs-2006.pdf

for drinking, swimming, recreation, and fishing. Massachusetts DEP has a TMDL program[36] that identifies the steps and technologies needed to reduce the pollutant or source of impairment for each impaired water body in Massachusetts to reduce pollution from both point and nonpoint sources in order to meet water quality standards.

Many of Greenfield's surface waters are classified as coldwater fish resources (CFRs) by the Massachusetts Division of Fisheries and Wildlife (MassWildlife). According to MassWildlife, cold water fish resources are particularly sensitive habitats. Changes in land and water use can reduce the ability of these waters to support trout and other kinds of cold water fish. Identification of CFRs are based on fish samples collected annually by staff biologists and technicians. MassWildlife updates the list of CFRs in the state on an annual basis and maintains an interactive map online. Conservation commissions, planning boards, land trusts, regional planning agencies, and open space committees can refer to the list and map of CFRs to better inform conservation planning.[37]

Coldwater fish resources are particularly vulnerable to warming temperatures and changing precipitation patterns due to climate change, placing increased importance on protecting these resources now. As temperatures rise, species adapted to cool water temperatures will be increasingly under stress. Tree cover in stream riparian areas and around ponds is particularly important for regulating water temperatures. According to MassWildlife's Climate Action Tool, maintaining a forested buffer of at least 100 feet along a stream is ideal, however, even a narrow strip of trees can provide vital shade for coldwater streams. Landowners can help by maintaining forested buffers or planting trees along open stream banks or allowing these areas to return to forest.

Rivers and Streams

MassGIS's 2016 land cover data identified 189 acres of surface waters covering 1% percent of the surface area of the City of Greenfield, consisting of a number of rivers, streams, and ponds. A number of these rivers and streams have habitat for rare and endangered species that are affected by nonpoint source pollution and can be protected through good open space management and acquisition of lands where these species exist.

According to Massachusetts Division of Fisheries and Wildlife, there are a total of ten Coldwater Fisheries Resources (CFR) in Greenfield; 9 in the Deerfield River Watershed and 1 in the Connecticut River Watershed:

Deerfield River Watershed

1. Punch Brook
2. Green River
3. Glen Brook

[36] https://www.mass.gov/total-maximum-daily-loads-tmdls

[37] https://www.mass.gov/service-details/coldwater-fish-resources, accessed on September 4, 2018.

4. Hinsdale Brook
5. Allen Brook
6. Smead Brook
7. Deerfield River
8. Sheldon Brook

Connecticut River Watershed

1. Fall River

Connecticut River

The Connecticut River forms a large portion of Greenfield's eastern boundary. The Rocky Mountain Ridge separates most of the river from the City. The Connecticut River has a "Class B" water quality designation from the New Hampshire- Vermont border to Holyoke and is classified as a warm water fishery. Class B waters are supposed to provide suitable habitat for fish and other wildlife and to support primary contact recreational activities such as fishing and swimming. The water should also be suitable for irrigation and other agricultural uses. The classification of rivers and streams in Massachusetts does not necessarily mean that the river meets that classification; rather, classifications represent the State's goal for each river.

According to the Massachusetts 2016 Integrated List of Waters[38] , the Connecticut River from the New Hampshire/Vermont state line down to the Turners Falls dam is impaired by polychlorinated biphenyls (PCBs) in fish tissue, other flow regime alterations, and alteration in stream side or littoral vegetative covers. Additionally, there has been sampling for *E.coli* by the Connecticut River Conservancy (CRC) bi-weekly from 2014-2019 because of heavy recreational use. *E. coli* is a bacteria found in all warm-blooded animals, including humans. The CRC tests for *E. coli* as an indicator for the presence of other pathogens that may cause waterborne illnesses to those swimming, wading, or boating.

The Connecticut River is impaired by polychlorinated biphenyls (PCBs) along its total length and by *E. Coli* and Total Suspended Solids from Turners Falls Dam to its confluence with the Deerfield River. A report published in January 1998 by the New England Interstate Water Pollution Control Commission (NEIWPCC) listed bioaccumulation and toxicity as water quality issues for the entire length of the Connecticut River in Massachusetts. Bioaccumulation refers to the concentration of toxins in organisms at higher levels in the food chain. The report specifically identified PCBs in fish. In 2019, as it has for previous years, the Massachusetts Department of Public Health, Bureau of Environmental Health issued a fish consumption advisory.

Although wastewater treatment facilities constructed throughout the watershed have been treating major pollution discharges for more than twenty years, the Connecticut River is still affected by pollution from combined sewer overflows, PCBs, chlorine heavy metals, erosion, landfill leachate, storm water runoff and acid rain. Long Island Sound has a "dead zone" from too much nitrogen being

[38] https://www.mass.gov/files/documents/2017/08/zu/16ilwplist.pdf

discharged into the Sound, and over the next several years, Massachusetts may be required to make additional efforts to reduce nitrogen inputs into the Connecticut River and its tributaries.

Due to pollution and low flow conditions, the Connecticut River's potential as a valuable recreational asset has not been pursued in the past. However, as the water quality has improved, recent plans recommend the acquisition and development of a boat launch site in Greenfield at the Meadows Golf Course. The Wedgewoods Garden property is another location of interest for a boat launch, but due to the grade of the launch site the City would have to pursue construction using capital funds.

Deerfield River

The Deerfield River is a major tributary to the Connecticut River and extends 70.2 mainstem river miles from the river's source on Stratton Mountain (VT) to its mouth in Greenfield, MA. The Deerfield River Watershed Association (DRWA) has been monitoring the Deerfield River and several of its tributaries in Massachusetts for water quality since 1990. The results of its 2002 Volunteer Monitoring Program note that the alkalinity levels in the watershed are low, which can stress the native trout fishery. Dissolved oxygen levels have been historically high and were found to continue to be so. After five years of collecting bacteria data, the DRWA has concluded that dry spells in the watershed do not pose a bacterial threat to the Deerfield River and the tributaries it monitors and thus, these waters are safe for contact recreation during times of drought. Conversely, it was found that high rainwater events, with stormwater runoff, do pose a bacterial threat at several of the monitored sites, making them unsafe for swimming at those times.

The City of Greenfield has an aging sewage collection system that experiences significant inflow and infiltration during high rainfall events. At times the flow to the Greenfield Water Pollution Control Facility on Deerfield Street greatly exceed the capacity of the facility to adequately treat sewage inflow, resulting in the impairment water quality of the Deerfield River, which flows into the Connecticut River.

Recreational opportunities in the Deerfield River abound. Many people enjoy paddling the southern section of the Deerfield River, but currently there are no designated launch sites in Greenfield.

Fall River

The Fall River forms the remainder of Greenfield's eastern boundary to the north. This river, with its valley bottom and steep adjacent land, has high potential for conservation and recreation use. Currently the land has limited public access, though it has been viewed as an excellent river for fly-fishing.

Green River

The Green River flows the entire length of Greenfield, starting in the northwest, continuing between Leyden and Plain Roads until it reaches Greenfield Meadows, an area known for its rich agricultural soils. The Green River serves multiple purposes for the City. North of Greenfield in the Town of Leyden, a dam creates an impoundment for water supply on the Green River and provides part of Greenfield's municipal water supply at the Leyden Glen Reservoir. Further downstream, water is also drawn from the

river for water supply at the dam at Eunice Williams Road. The river is used more heavily in the summer months to assist with peak water demands. The City's pattern of seasonal use emphasizes the importance to maintain the high water quality of the Green River for the City's municipal water needs.

Paddling on the Green River. Photo Credit: Mary Chicoine

Through its most northern section, the Green River is a significant fish and wildlife corridor. The central area has historically contributed to the City's agriculture, as the source of fertile soils deposited by periodic flooding. Mead Street, a discontinued road off Deerfield Street provides access along the river for recreational uses. Historically, the creation of a greenway along the river for conservation and recreational purposes has substantial public support.

In 2007, the Army Corps of Engineers (USACE) completed an environmental assessment and feasibility study for the four dams owned by the City of Greenfield. The Wiley Russell Dam, which is classified as a Low Hazard dam is located on the Green River. The City previously had plans to remove the dam but as of November 2020 the City is considering alternative options, such as repairing the dam or completing a partial removal and restoration.

Ponds

Highland Pond

Highland Pond is a small spring-fed pond located in Highland Park between the parking area and tennis courts. This is the only pond with public access in Greenfield. The pond significantly adds to the scenic attractiveness of the park which is surrounded by benches and walking paths. A warming hut for skaters, which is currently unused, sits on the eastern shore of the pond. Although the pond was previously cleared in the winter for ice skating, the difficulty in maintaining the surface, and the inability to restore the pond to maintain a healthy depth has taken this pond off the list of skating sites. The City of Greenfield has considered restoring the pond for ice-skating, as many residents are interested in this activity, but it would be an expensive project and would require several assessments before the work could begin. Highland Pond is an environmentally sensitive area and surrounded by NHESP Priority Habitat; any work completed would need to be carefully planned in order not to disturb the flora and fauna present at the site.

Maynard Pond

Maynard Pond is a five-acre warm water pond located just north of the Route 2 bypass. The land around the pond is both private and municipally owned. The Franklin Conservation District has identified this pond and adjacent land as a potential site of a neighborhood park. The banks and open field on the shallow northern end of the pond could be lined with shrubs and trees to provide food and cover for wildlife. A wildlife conservation and nature study area could be established.

Newell Pond

Newell Pond is a small pond, about one acre in size and located west of Bernardston Road. It is limited in its potential for use as a recreational resource and is currently used only for ice-skating.

D.3 AQUIFER RECHARGE AREAS

An aquifer is an underground body of water that is typically found in layers of sand deposited during the glacial period. According to MassGIS, Greenfield contains one large high yield aquifer that covers a broad swath of northern Greenfield, and one medium yield aquifer in southeastern Greenfield. A high-yield aquifer is said to provide a potential yield of more than 200 gallons per minute, whereas a medium-yield aquifer is said to provide a potential yield of greater than 25 gallons per minute.

Although climate change is resulting in an increase in precipitation overall, it is occurring in heavier, shorter periods, with more intense dry spells in between. More intense rainfall leads to greater amounts of water running off the land into rivers and streams instead of infiltrating into the ground. In addition, more rain is expected in the winter, reducing the snowpack and spring melting that helps recharge aquifers. Higher risk of drought may stress underground water resources.

The City actively works to protect the aquifer recharge areas in Zones 1, 2, and 3 surrounding the Mill Brook Wells. The acquisition of the Maple Brook Farm, adjacent to the Mill Brook Wells, was a land purchase made possible through a grant by the Department of Conservation and Recreation. The City also owns land surrounding the area by the Eunice Williams Road Dam on the Green River as well as land in Leyden surrounding the Glen Brook Reservoir. Additional land purchases in these areas could provide increased protection of these important public water supplies. In addition to purchasing land, it is also important to work with neighboring towns to protect these important shared water resources through zoning and existing state and federal regulations.

On March 3, 2004 the Greenfield Town Council voted to create a Water Supply Protection District (WP) by-law. The purpose of the Water Supply Protection District by-law is to “protect, preserve and maintain existing and potential sources of groundwater supply, groundwater recharge and watershed areas within the Town for the public, health, safety, and general welfare of the community”(~200-4.14 Greenfield Water Supply Protection District bylaw).

D.4 FLOOD HAZARD AREAS

Water levels in Greenfield's rivers, streams, and wetlands rise and fall seasonally and during high rainfall events. High water levels are typical in spring, due to snowmelt and ground thaw. This is the period when flood hazards are normally expected. Low water levels occur in summer due to high evaporation and plant uptake (transpiration). At any time, heavy rainfall may create conditions that raise water levels in rivers and streams above bank full stage causing them to overflow adjacent lands.

Flood hazard areas include the watercourses (rivers and streams) and adjacent relatively low-lying areas subject to periodic flooding (the 100-year flood zone and 500-year flood zone). The 100-year floodplain has a one percent chance of being flooded in a single year, while areas in the 500-year floodplain have a 0.2% chance of being flooded in any given year. However, due to climate change changing precipitation patterns, the chances of Greenfield experiencing a 100-year or 500-year flood is higher than previously predicted.

Greenfield participates in the National Flood Insurance Program. The City's Zoning Bylaw contains a Floodplain Overlay district that restricts development within floodplains. The major floods in Greenfield have resulted from rainfall alone, or in combination with snowmelt. The City relies on FIRM (National Flood Insurance Rate Map) maps, and utilizes the electronic FEMA (Federal Emergency Management Agency) maps to determine flood hazard areas. The following areas have been designated as flood hazard areas in Greenfield on the Flood Rate Insurance Map (FIRM) dated July 2, 1980[39]:

- Arms Brook;
- Cherry Rum Brook;
- Punch Brook;
- Glen Brook;
- Allen Brook;
- Mill Brook;
- McCard Brook;
- Smead Brook;
- Wheeler Brook;
- Fall River;
- Deerfield River;
- Green River; and
- Connecticut River.

The City of Greenfield also recently updated their Hazard Mitigation Plan. During the planning process, the Committee detailed other areas throughout the City that are subject to frequent flooding. Areas of chronic localized flooding include:

- Green River Cemetery, where water has periodically pooled and caused mudslides
- Factory Hollow Road along the Fall River has chronic flooding

[39] In November 2018, FEMA began a 5-7 year project called "Risk MAP" to digitally modernize the floodplain maps in Franklin County, including for the City of Greenfield, using LIDAR data and a watershed-oriented approach.

- Nash's Mill Road floods annually
- The Meadow's Golf Course floods annually
- Hastings, Haywood and Riddell Streets neighborhoods flood during heavy rain events when the Maple Brook Culvert backs up
- Green River Park floods every few years
- Green and Cooke Streets and Greenway Lane – this neighborhood floods during heavy rain events
- Thayer Road, Keegan Lane, Sunset Avenue, Homestead Avenue
- Riddell Street
- Maddison Circle
- Spring Terrace
- Arch Street and Chapman Street neighborhood

The City's updated Hazard Mitigation Plan fully details past flood events and the extent of the damage incurred. The plan can be referenced here: https://greenfield-ma.gov/f/0/1292/Hazard-Mitigation-Plan-Update

D.5 RIVER CORRIDOR MAPPING AND MANAGEMENT

In 2019, FRCOG released *The River Corridor Management Toolkit*, which developed and piloted innovative practices for delineating river corridors using a scientifically defensible mapping protocol. The toolkit outlines two management tools to accompany the mapping: a River Corridor Protection Overlay Zoning District Bylaw and a River Corridor Easement Restriction. The goal of the River Corridor Management Toolkit is to equip communities and landowners interested in river restoration and protection, climate resilient land use, and the reduction of harm to land, water, habitat, people and infrastructure caused by increasingly severe and frequent flood events. In this way, Greenfield is well-positioned as a steward of the Green River and its mapped river corridor.

Rivers and streams are dynamic systems in a constant state of change. Fluvial erosion is a natural process of wearing away of soil, vegetation, sediment, and rock through the movement of water in rivers and streams. While erosion is a natural process, the rate of erosion is affected by human alterations of river channels or land as well as a changing climate. Sometimes buildings and roads are located too close to river banks and areas of active river processes, placing them at risk to erosive forces while at the same time increasing the rate of erosion within the river corridor due to loss of flood storage in the floodplain.

Greenfield could seek to apply the river corridor mapping protocol to the tributaries of the Green River, in addition to pursuing funding to complete resiliency projects identified for the Green River. Newly mapped river corridor areas for tributaries would guide planning efforts involving flood resilience and land conservation, which may foster opportunities to meet some of the City's priority recreational objectives, such as increasing access to waterways.

D.6 WETLANDS

According to 2016 MassGIS Land Cover data, approximately 6 percent of Greenfield is covered by wetlands. The primary type of wetland located within the City's boundaries are deciduous swamp wetlands, and can be found along the Green River and Cherry Rum Brook.

According to the Massachusetts Wetlands Protection Act, Bordering Vegetative Wetlands (wet meadows, marshes, swamps and bogs) are likely to be significant in the protection of public and private water supply, ground water supply, flood control, storm damage prevention, prevention of pollution, the protection of fisheries and wildlife habitat. Bordering Vegetated Wetlands are freshwater wetlands where water is at or near the surface during a significant portion of the year. They are found bordering creeks, rivers, streams, ponds and lakes and promote the growth of wetland indicator plants. Wetland vegetation is extremely important because it provides habitat for a wide variety of wildlife, including state and federally listed species. According to the Wetlands Protection Act, Bordering Vegetative Wetlands are likely the Commonwealth's most important habitat for wildlife.

Land Subject to Flooding is another important resource area in Greenfield. According to the Wetlands Protection Act, Bordering Land Subject to Flooding provides a temporary storage area for flood water which has overtopped the bank of the main channel of a creek, river or stream, or the basin of a pond or lake. The characteristics of Bordering Land Subject to Flooding provide important food, shelter, migratory, over wintering, and breeding areas for wildlife. Vernal pools are frequently found in the 100 year flood plain.

Vegetated buffer strips are strips of vegetation, such as shrubs, trees and herbaceous plants, that provide a filter for sediment, nutrients, pesticides and other pollutants before they reach a water body. Vegetative buffer strips are particularly important to resource areas in Greenfield due to the large number of important water resources and drinking water supplies. In addition, buffer strips provide stabilization of stream and riverbanks by preventing bank erosion and slumping. Trees and shrubs in buffer strips provide shade which help maintain a cooler water temperature. This is particularly important in rivers such as the Green River that are considered by the Army Corp of Engineers to be Essential Fish Habitat that support cold-water fisheries (MA DEP).

The Greenfield Conservation Commission is responsible for the local administration, implementation, and enforcement of the Massachusetts Wetlands Protection Act (MGL Ch. 131, Sec. 40) and the City of Greenfield's Wetland Protection Ordinance (Chapter 195). The Wetlands Protection Act defines areas subject to protection in the State of Massachusetts. Most resource areas subject to protection also have a 100-foot buffer zone around them, with the exception of perennial rivers and streams, which have 200 feet of riverfront jurisdiction per the Massachusetts River Protection Act. The City of Greenfield Wetlands Protection Ordinance, which was adopted August 15, 2001, enforces that all resource areas have a 25-foot "No Disturb Zone" and prohibits certain activities in the floodplain. Work within the floodplain requires 100 percent compensatory storage as well as additional provisions. The Conservation Commission updated the Wetlands Protection Ordinance in 2016.

City of Greenfield Open Space & Recreation Plan 2021

Water Resources

0 0.5 1 Miles

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Franklin Regional Council of Governments

E. VEGETATION

E.1 GENERAL INVENTORY

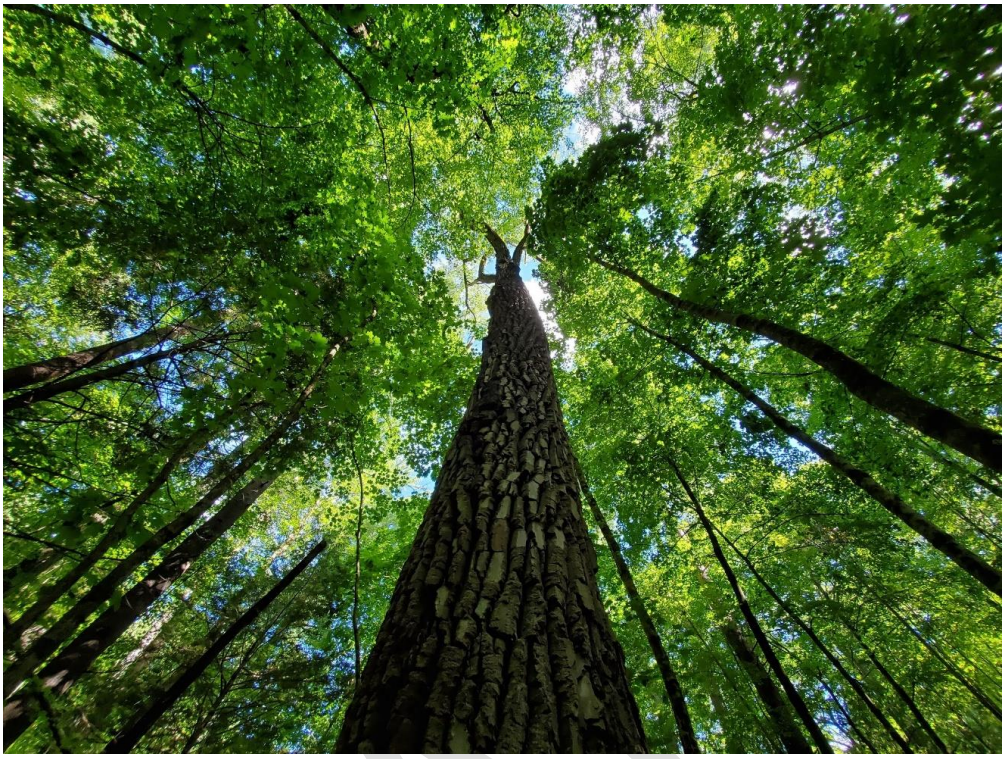
Greenfield's vegetation consists of a broad array of vegetation types due to the City's diverse topography, geology and land use patterns. Forrest types include northern hardwoods (comprised primarily of sugar maples, white ash, paper birch and hemlock) and transition hardwoods (comprised primarily of red oak, black birch, white pine and hemlock) according to Greenfield's BioMap2 report produced by the Natural Heritage & Endangered Species Program. Major river and high-terrace floodplain forests exist, as well as floodplain forests and red maple swamps. Non-forest vegetation types include old fields, playing fields, open marsh, swamps, wet meadows, highland meadows and numerous agricultural areas. Common shrub and herbaceous species present in Greenfield that are important food sources for local wildlife are flowering dogwood, choke cherry, high bush and low bush blueberry, mountain laurel, witch hazel, aster, dandelions, goldenrod, sweet fern, cattail, and water lilies (NHESP; 2001).

E.2 FOREST

Greenfield is fortunate to have forested open space and conservation lands located throughout the City. Approximately 60 percent of Greenfield is forested.[40] The predominant forest type in Greenfield is the transition hardwoods-white pine forest. Within this forest type, northern hardwoods such as yellow and paper birch, beech, and sugar and red maple are the major species. On the dryer sites, oaks and hickories can be found with red oak being the most abundant deciduous species. Hemlock occurs in the moist cool valleys, north and east slopes, and sides of ravines in Greenfield. White pine is characteristic of the well-drained sandy sites. The transition hardwood-white pine forest type commonly occurs up to an elevation of 1,500 ft. above sea level in upland central Massachusetts and southern New Hampshire, northward through the Connecticut Valley.

The publicly owned forestlands are enjoyed for walking, snowshoeing, and nature study along with being an important habitat for wildlife. Heavily forested publicly owned areas in Greenfield include Highland Park, Rocky Mountain Park, Temple Woods, GTD Conservation Land, and Leyden Woods.

[40] 2016 MassGIS Land Use Land Cover Data



A tree stand in Temple Woods. Photo credit: Mary Chicoine

The second highest natural resource goal in the *Franklin County 2035 Regional Plan for Sustainable Development (RPSD)* is to protect forests. Unfragmented forests, old-growth forests, and forests that support rare and endangered plant and animal species are especially ecologically valuable, especially in the face of accelerating climate change impacts. Forests along rivers and streams are also a priority to protect for their important habitat, water recharge functions, and bank stabilization. The plan lists several potential impacts on forests due to climate change, including decline of maple syrup production, the deterioration of the Eastern Hemlock, and the spread of invasive insect species.

Forests play a critical role in mitigating future climate change. The Massachusetts Attorney General's Office's Energy and Environment Bureau has been promoting that role, stressing that unfragmented forests play a critical role in protecting our climate and our citizen's public health. The AG's office points to recent research funded by Harvard Forest that illustrates that allowing forests to remain intact – or proforestation – increases carbon sequestration and long-term carbon storage in U.S. Forests.[41] The study, *Intact Forests in the United States: Proforestation Mitigates Climate Change and Serves the Greatest Good*, finds that "Intact forests—largely free from human intervention except primarily for trails and hazard removals—are the most carbon-dense and biodiverse terrestrial ecosystems, with additional benefits to society and the economy." Additionally, the study found that "reducing cutting on public lands had a larger effect" than either planting new forests or replanting areas that have been logged in the Northwest United States.

[41] https://www.frontiersin.org/articles/10.3389/ffgc.2019.00027/full#B58

Intact forests sequester and store carbon in tree roots, stems, branches and leaves, and in forest soils. Trees continue to sequester carbon for as long as they live. Young trees can grow quickly but older trees store more carbon. In Massachusetts, it is estimated that forests sequester 14% of the state's gross annual carbon emissions, according to Mass Audubon. According to Mass Audubon, "Keeping forest as forest avoids carbon emissions from land use conversion." Forest harvesting currently accounts for 85% of the carbon lost from forests each year.

Climate change is impacting forests in many ways. A longer growing season and increasing temperatures are shifting habitat conditions for trees northward and to higher elevations. Over time, the birch-beech-maple forests typical of New England will decline while oak-hickory forests more typical in areas south of New England will thrive. An expected increase in periods of drought between intense precipitation events may weaken some trees, leaving them more susceptible to insects and diseases, while it may improve conditions for other trees.

Maintaining healthy forests well into the future will necessitate addressing stressors such as human disturbance, logging, and, invasive plant and insect species in an effort to increase forest resiliency. Forest resiliency is the capacity of a forest to respond to a disturbance by resisting damage or stress and recovering quickly. Depending on the forest type, location, history, and surrounding landscape, forests will have varying degrees of vulnerability and resiliency.

The City of Greenfield should consider forest resiliency and carbon storage opportunities such as carbon trust when developing management or stewardship plans for City owned properties, such as GTD Conservation Land, and when acquiring forested land parcels. Joining a carbon trust could be a source of revenue that would enable the City to continue to support recreational spaces and open space acquisition.

STREET TREE PROGRAM

The Greenfield Tree Committee is an active volunteer group in the City that works closely with the Greenfield Department Works in an advisory and supportive capacity to maintain the City's urban forest.[42] Street trees are essential infrastructure, and some of the benefits they provide the City and its residents with include the following:[43]

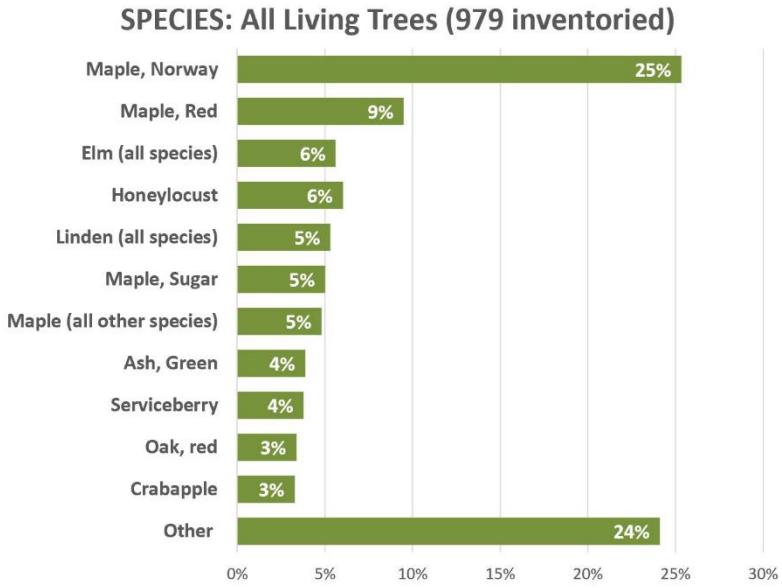
- Air quality improvement
- Water quality improvement (including improved stormwater management)
- Cooler air temperatures
- Carbon Storage and Carbon Sequestration
- Building energy conservation
- Noise reduction

[42] https://www.greenfieldtreecommittee.org/about

[43] Rick W. Harper, Ext. Assist. Professor-Urban and Community Forestry, UMass, "Realizing the Benefits of our Urban Trees," *3rd Annual Massachusetts Clean Energy Conference: Helping Communities with Renewables and Efficiency;* 2016.

- Wildlife habitat
- Social/psychological benefits
- Human health benefits
- Beautification

Figure 4-3: Species of Street Trees in Greenfield



Three inventories of public street trees in the urban core of the City have been conducted in recent years (see the map included in Section 3 for the inventory area). The first tree inventory was conducted in 2014 by the FRCOG and showed that the street tree population was just over 50% Norway maple, most of which were in decline. A FRCOG windshield inventory in 2016 found three times as many trees had been removed between 2014 and 2016 than had been planted.

A complete inventory update was conducted by Greenfield Tree Committee in 2020. Findings from the 2020 inventory report indicate the street tree population is dominated by species of maple: 44% of all trees inventoried are maples, and 25% of all trees inventories are Norway Maples (down from 51% in 2014), which are a non-native species. The majority of the trees inventoried were large stature shade trees, which comprised 82% of the trees inventoried, with the remaining 18% comprised of small trees such as serviceberry or crabapple.

Greenfield, like many communities, suffered great losses to street trees with the invasion of Dutch Elm disease in the 1930s through 1950s. Prior to the infestation, Greenfield had large beautiful elm trees along many of its major streets. Norway maples became a popular shade tree after the loss of elm trees, but many of those trees are now in decline and are being removed. The Tree Committee's inventory found 77% of the City's trees that were found to be in poor condition were Norway maples. These 107 trees will likely need to be removed and replaced in coming years.

A total of 388 street trees have been planted in the Greenfield since 2014, due to the hard work and dedication of the DPW Forestry Division, the Greenfield Tree Committee, and funding from a U.S. Forest Service Landscape Scale Restoration Program grant. Trees being planted by Greenfield DPW and Greenfield Tree Committee are primarily native species such as several species of oaks as well as red maple, honeylocust and American linden.

Figure 4-4 shows where trees have been recently planted in the City.

Figure 4-4: Street Trees Planted in Greenfield since 2014

Source: Greenfield Tree Committee

It is important to choose street trees that are not invasive species and are adapted to urban growing conditions. Invasive species have the ability to spread rapidly displacing native species and destroying local ecosystems. Planting native street trees along the City's transportation corridors will promote a more pedestrian friendly environment as well as create wildlife habitat opportunities for songbirds, moths, butterflies and other species.

The Greenfield Tree Committee maintains interactive resources on the City's trees, and postings about recent inventories in addition to a page on tree selection for residential sites. These resources are available online at: https://www.greenfieldtreecommittee.org. The OSRP Action Plan contains many items related to improving and maintaining the City's tree canopy.

E.3 AGRICULTURAL LAND

Agricultural Preservation Restrictions (APRs) currently protect 1,136 acres within Greenfield, with an additional 935 acres held in Chapter 61A. The largest blocks of working farmland are located within the northern area of the City, west of Route 5 and north of Route 2. The largest continuous track occurs between Leyden Road and Country Club Road. Additionally, the Department of Conservation and Recreation (DCR) hold a 119-acre tract of land in southeastern Greenfield (Kells Farm) offering areas of grasslands and farmland, vitally important for wildlife populations.

In 2015, the Franklin Regional Council of Governments (FRCOG) published the *Franklin County Farm and Food System Project* report. The project summarizes the needs of Franklin County farmers to increase food production, as well as how to make more local food accessible to Franklin County residents, particularly low and moderate-income people. Results of a survey of farmers showed a need for access to more farmland, and that farmland is currently too expensive. The report includes recommendations for increasing farmers' access to land, such as through land matching and leasing as well as by making public-owned land available for farming, where appropriate. Other land recommendations from the report include increasing the amount of farmland under permanent protection, and preventing land from being converted from farming to other uses, in part by offering farmers more technical assistance with farm transition and estate planning. Ensuring that good farmland – and the farm buildings and housing on it - remains available and affordable for farming will help continue to support the growth of this important part of the region's rural economy. These land recommendations are also supportive of open space and recreational planning in the City.

Climate change makes farmland protection even more vital. Locally grown and harvested products allow communities to be more self-sufficient and to contribute to the reduction of pollution and use of fossil fuels associated with industrial agriculture. Purchasing locally grown food and farm products also supports the continued viability of farming and food related jobs in the region, and therefore helps protect farmland from conversion to other uses. Many farmers in Franklin County sell their produce locally, either directly on the farm, through farmers markets and community supported agriculture (CSAs), or through stores that are committed to purchasing from local farms.

E.4 WETLAND VEGETATION

Wetland resources present in Greenfield include open waters, rivers and streams, banks, marshes, wet meadows, forested wetlands, swamps, isolated wetlands, and vernal pools. The majority of the wetland vegetation consists of shrub swamp, marshes, meadows and forested wetlands.

E.5 FLOODPLAIN FORESTS

Vegetation along the banks of the Connecticut, Green and Deerfield Rivers, as well as their tributary streams, provides several important benefits. Forested buffers purify water by filtering out harmful nutrients from road run-off, lawns, and agricultural fields, therefore reducing the amount of suspended solids and phosphates that may enter the river. Willow, birch, trembling aspen, and red maple decrease erosion and sedimentation in Greenfield's floodplains by slowing water velocity. Vegetation also adds to the organic matter content of local soils, shelters and feeds wildlife, and cools water temperatures, which inhibits excessive growth of algae and aquatic vegetation. Vegetation acts as a natural sponge that absorbs, holds, and slowly disperses water toward rivers. This is particularly important during major storm events and the springtime thaw when flooding may be an issue. Floodplain forests are considered to be among the most threatened, globally significant wetland community types in New England. Unfortunately due to their high soil fertility and scenic qualities, many floodplain forests throughout the country have been converted to agricultural uses or cleared for residential and commercial development.

E.6 RARE, THREATENED, AND ENDANGERED PLANT SPECIES

NHESP has identified 258 native plant species as rare in the Commonwealth, and a number of rare plants have been documented in the City of Greenfield. These plants occur in some of the Priority Habitats identified in the *Community Setting* Section. Plants (and animals) listed as *endangered* are at risk of extinction (total disappearance) or extirpation (disappearance of a distinct interbreeding population in a particular area). *Threatened* species are likely to become endangered in the foreseeable future. *Species of special concern* have been documented to have suffered a decline that could result in their becoming threatened, or occur in very small numbers and/or have very specialized habitat, the loss of which could result in their becoming threatened (NHESP, 2017). Rare plant species in the City of Greenfield are listed in Table 4-2.

Table 4-2: Plant Species in Greenfield Listed as Special Concern, Threatened, or Endangered

Scientific Name	Common Name	MESA Status*	Most Recent Observation
Celastrus scandens	American Bittersweet	T	2017
Geum fragarioides	Barren Strawberry	S-C	2017
Ranunculus pensylvanicus	Bristly Buttercup	S-C	1911
Hydrophyllum canadense	Broad Waterleaf	E	2014
Sanicula odorata	Clustered Sanicle	T	2017
Viburnum rafinesqueanum	Downy Arrow-wood	E	2018
Eragrostis frankii	Frank's Lovegrass	S-C	1984
Panicum philadelphicum ssp. gattingeri	Gattinger's Panic-grass	S-C	1978
Hypericum ascyron	Giant St. John's-wort	E	1911
Carex grayi	Gray's Sedge	T	2017
Lobelia siphilitica	Great Blue Lobelia	E	2014
Boechera missouriensis	Green Rock-cress	T	2010
Carex hitchcockiana	Hitchcock's Sedge	S-C	2013
Desmodium cuspidatum	Large-bracted Tick-trefoil	T	1978
Minuartia michauxii	Michaux's Sandwort	T	2018
Alnus viridis ssp. crispa	Mountain Alder	S-C	2014
Mimulus moschatus	Muskflower	T	2010
Cerastium nutans	Nodding Chickweed	E	2013
Triphora trianthophoros	Nodding Pogonia	E	1981
Clematis occidentalis	Purple Clematis	S-C	2008
Amelanchier sanguinea	Round-leaved Shadbush	S-C	1991
Prunus pumila var. depressa	Sandbar Cherry	T	2014
Salix exigua ssp. interior	Sandbar Willow	T	1991
Carex lenticularis	Shore Sedge	T	1984
Boechera laevigata	Smooth Rock-cress	S-C	2010
Juncus filiformis	Thread Rush	E	2019
Symphyotrichum tradescantii	Tradescant's Aster	T	2014

Scientific Name	Common Name	MESA Status*	Most Recent Observation
Carex tuckermanii	Tuckerman's Sedge	E	1997
Deschampsia cespitosa ssp. glauca	Tussock Hairgrass	E	2018
Oligoneuron album	Upland White Goldenrod	E	2018
Calystegia spithamaea	Upright Bindweed	E	2018

*SC – Special Concern; T - Threatened; E – Endangered.

Source: Massachusetts NHESP, Town Species Viewer: https://www.mass.gov/info-details/rare-species-viewer.

Any MESA listed species with a most recent observation date within the past 25 years is considered to be current. Older dates may be species that have not been recently inventoried, or they may be lost from Greenfield as land use has changed and water quality has changed. Fact Sheets describing many of the MESA listed species and their habitats are available from the state's Natural Heritage and Endangered Species Program (NHESP) website.[44]

F. FISHERIES AND WILDLIFE

Greenfield's forests, rivers, wetlands and open farmland, as discussed in previous sections, provide habitat for a variety of common and rare wildlife species. This section discusses wildlife species and their habitats from the perspective of natural communities, individual species, and patterns of wildlife distribution and movement across the landscape.

F.1 GENERAL INVENTORY

The combination of the varied and diverse habitats found in the Greenfield help promote the numerous wildlife and fisheries populations that live in the area. Greenfield is home to a vast array of wildlife, both permanent and migratory.

Mammals: Mammalian species include white tail deer, black bear, snowshoe hare, raccoon, red fox, gray fox, bobcat, weasel, woodchuck, coyote, fisher and moose. The wetlands, swamps, and streams in the City provide ideal habitat for muskrat, otter, beaver, mink, and skunk. Smaller, more common mammalian species with a lesser home range include chipmunk, gray squirrel, red squirrel, deer mouse, white-footed mouse, meadow vole, star-nosed mole, pygmy shrew, least shrew, eastern mole, opossum, porcupine, and ermine. Several species of bats are also common to the area, and include little brown myotis, silver haired bat, eastern pipistrelle, and the big brown bat, though since the onset of white nose syndrome in Massachusetts, the state's population of little brown bats has dwindled to less than 1% of what it once was.[45]

[44] https://www.mass.gov/service-details/list-of-plants.

[45] https://www.mass.gov/service-details/bat-mortality-in-massachusetts

Birds: Common bird species present in Greenfield include cedar waxwing, northern cardinal, American goldfinch, blue Jay, red-bellied woodpecker, northern mockingbird, brown-headed cowbird, downy woodpecker, common grackle, eastern bluebird, white-breasted nuthatch, American robin, and the mourning dove. Over 150 different migratory bird species, including songbirds such as vireos, flycatchers, thrushes, tanagers and wood warblers, have also been identified as having a potential habitat in the area surrounding river corridors used as migration routes. Resident water fowl species including wood ducks, mallard duck, hooded mergansers, blue heron, green-backed heron, Canadian geese and others are also found along the edges of the riverbanks.

Field-nesting birds (eastern meadowlarks, bobolinks, Savannah sparrows, and others) regularly breed in conservation and APR fields. Large expanses of open farmland are also important to species such as the Northern Harrier, turkey vultures, hawks, turkeys, quail, ring-necked pheasant, ruffed grouse, and flocks of migratory birds including several different types of warblers and sparrows. Raptors such as bald eagles, Cooper's hawk, red-shouldered hawk, red-tailed hawk, and the peregrine falcon are also regularly found along the riverbanks; using trees as perch sites for hunting and scavenging. Many other species of hawks migrate through the area as well in spring and fall; though breeding is limited to red-tailed, American kestrel, goshawk, coopers, and red-shouldered. Greenfield is also home to three separate owl species, including the great horned owl, barred owl, and the northern saw-whet owl which occupy most or all available habitats in the City.

According to Mass Audubon's *State of the Birds* report, 30% of breeding bird species in Massachusetts are already declining and are in need of conservation action. Climate change will increase stress on many of those species, as well as additional species, and will do so in both predicted and unpredicted ways. For example, increasing temperatures can shift the timing of important events, such as leaf and insect emergence. Those changes in phenology can cause declines in long-distance migrant birds as their arrival on their breeding grounds misses the periods of peak food abundance. Their climate change projections estimate that 43% of the breeding species evaluated as a part of their study are highly vulnerable to climate change by the year 2050.[46] Mass Audubon's full report can be found at the link below for projected impacts on specific species.

Amphibians & Fish: The Deerfield River forms the southern boundary of the City and is a key habitat for several anadromous fish species (those that are born in fresh water, migrate to salt water where they mature and then return to freshwater to spawn) including striped bass, sea lamprey, blue-black herring, American shad, Atlantic salmon and shortnose sturgeon. The Deerfield River is also one of Massachusetts' premier Atlantic salmon restoration rivers. The river and its tributaries are nursery habitat for juvenile Atlantic salmon. Adult sea-run salmon are expected to use the river for natural reproduction (U.S. Fish & Wildlife Service; 1995). The Deerfield is also the most intensively fished and

[46] *State of the Birds.* Mass Audubon, September 2019. https://www.massaudubon.org/content/download/21633/304821/file/mass-audubon_state-of-the-birds-2017-report.pdf

managed trout fishery in Massachusetts because the river has relatively clean water, is accessible, and there are a variety of fish habitats along its length.

Limited access to the Connecticut River, which forms the eastern boundary of Greenfield, has meant that it is generally a less utilized fishing or boating destination. Resident fish species include walleye, channel catfish, northern pike, small and largemouth bass, and pickerel. American shad, blue-black herring, and shortnose sturgeon also spawn within this stretch of the Connecticut River.

An eft (terrestrial juvenile phase of a salamander) in Temple Woods. Photo credit: Mary Chicoine

Amphibians and reptiles species have been catalogued in the areas as well. They include several different species of salamanders, frogs, toads, turtles, snakes amongst others.

F.2 RARE, THREATENED, AND ENDANGERED WILDLIFE AND FISHERIES SPECIES

NHESP has identified 169 species of animals in Massachusetts that are protected under the Massachusetts Endangered Species Act (MESA). Table 4-3 displays MESA-protected species that have been observed in Greenfield, and that may be found in the NHESP Priority Habitat areas identified in the 14th edition of the Natural Heritage Atlas (effective August 1, 2017). Animals listed as *endangered* are at risk of extinction (total disappearance) or extirpation (disappearance of a distinct interbreeding population in a particular area). *Threatened* species are likely to become endangered in the foreseeable future. *Species of special concern* have been documented to have suffered a decline that could result in their becoming threatened, or occur in very small numbers and/or have very specialized habitat, the loss of which could result in their becoming threatened (NHESP, 2017).

Table 4-3: Animals listed as Endangered, Threatened, or Species of Special Concern Identified in Greenfield

Taxonomic Group	Scientific Name	Common Name	MESA Status	Most Recent Observation
Bird	*Haliaeetus leucocephalus*	Bald eagle	T	2018
Bird	*Falco peregrinus*	Peregrine falcon	T	2019
Butterfly/Moth	*Pyrrhia aurantiago*	Orange sallow moth	SC	2010
Dragonfly/Damselfly	*Boyeria grafiana*	Ocellated darner	SC	2005
Dragonfly/Damselfly	*Hylogomphus abbreviatus*	Spine-crowned Ccubtail	SC	2017
Fish	*Notropis bifrenatus*	Bridle shiner	SC	1962
Fish	*Hybognathus regius*	Eastern silvery minnow	SC	1959
Fish	*Chrosomus eos*	Northern redbelly dace	E	2002
Fish	*Acipenser brevirostrum*	Shortnose sturgeon	E	2018
Mussel	*Strophitus undulatus*	Creeper	SC	1947
Mussel	*Lampsilis cariosa*	Yellow lampmussel	E	2007
Reptile	*Glyptemys insculpta*	Wood turtle	SC	2013

T= Threatened, SC = Special Concern; E = Endangered.

Source: Massachusetts Natural Heritage and Endangered Species Program, Rare Species by Town Viewer: https://www.mass.gov/service-details/rare-species-by-town-viewer.

Where BioMap2 is a planning and conservation tool with no regulatory significance, State-listed rare species and Priority Habitat areas are regulated by the Massachusetts Endangered Species Act. Projects resulting in a "take" of state-listed rare species and disturbing two or more acres of Priority Habitat of Rare Species may be required to file an Environmental Notification Form (ENF) with the State.

As mentioned in the beginning of this section, climate change is expected to alter species distributions. As species move to adjust to changing conditions, federal, state and local agencies and entities involved in land conservation need a way to prioritize strategic land conservation that will conserve the maximum amount of biological diversity despite shifting species distribution patterns.

F.3 WILDLIFE CORRIDORS

Permanently protected wildlife corridors are particularly critical in a landscape that is experiencing development pressures to ensure that animals have the ability to travel across vegetated areas between large blocks of habitat. Connections between bodies of water and sub-watersheds are also important for wildlife and fisheries species. Many species of wildlife in Greenfield have home ranges greater than fifty acres in size. Even those species with smaller home ranges move across the landscape between sources of shelter, water, food and mating areas. Some animals, including white-tailed deer and black bear, seek both interior forest habitat and wetland edges where food sources may be more abundant.

Natural Heritage and Endangered Species Program considers the riparian areas along the Connecticut, Green and Deerfield Rivers as critical habitats. The Connecticut, Green and Deerfield Rivers play a dual

role for the region's wildlife. Riparian corridors often contain a greater degree of species diversity than any other portion of the landscape. The rivers also serve as important regional migration corridors for anadromous fisheries as well as for mammals like the bobcat that may use the riparian forests to move between habitat areas. River corridors are also major migration routes for many species of migratory birds. The Connecticut River is located in the "Atlantic Flyway" where waterfowl migrate north and south each year. The north and south flow of this inland river provide direction, nesting and feeding areas for this great migration. Some of the more common animals that use river and stream corridors are beaver, muskrat, raccoon, green heron, kingfish, snapping turtle, and many species of ducks, amphibians, and fish. Floodplain forests also provide sheltered riverside corridors for deer and migratory songbirds.

The Green River serves as a regionally significant corridor for rare species and wildlife habitat. The Green River contains large contiguous forest patches running along the ridges, parallel to the Green River floodplain, which serve as travel lanes for wildlife. These areas connect to the protected open space in Leyden and intersect several state run wildlife management areas. This corridor is also designated by NHESP as priority habitat. The forest/field interface and the extensive network of varied landscapes on the Green River provide extensive opportunities for predatory activity by birds and mammals, as well as an abundance of niches for edge species.

Pollinator Corridors

The Commonwealth of Massachusetts has a rich diversity of native wild pollinators, including an estimated 380 species of bees and 120 species of butterflies. In recent decades, however, both managed, agricultural pollinators and wild, native pollinators nationwide have been experiencing significant challenges in their ability to survive and flourish. In the 2017 *Massachusetts Pollinator Protection Plan*, The Massachusetts Department of Agricultural Resources (MDAR) identified the need to evaluate, sustain and enhance pollinator populations in the state[47]. This urgent task is not only important to protect biodiversity and natural resources, it is also linked to the climate resiliency and sustainability of our local farms and food systems. Local agriculture is important to the character and economy of Greenfield and is a key industry sector of Franklin County.

The City of Greenfield is one of 8 communities in Franklin County currently working proactively to identify, create and support pollinator habitat in and around areas of development to respond to declining populations of native pollinator species. The City of Greenfield and the FRCOG are working to map local pollinator resource areas and identify corridor linkages at a municipal and landscape scale. Taken together, the work of the 8 towns will create the Regional Pollinator Action Plan of Franklin County, the first of its kind in Massachusetts. This plan is forthcoming and will document specific actions the City can take to support pollinator habitats.

[47] https://www.mass.gov/files/documents/2017/06/zw/pollinator-plan.pdf

Waterways, including wetlands, streams, and rivers, are critically important to pollinators. Not only are they home to high concentrations of flowering aquatic plants that feed native specialist and generalist pollinators, waterways are vital corridors the connect entire ecosystems and greater land areas, from uplands to wetlands. Wetland areas typically represent permanently protected open space where human activity is regulated under Massachusetts General Law, Chapter 131: Wetlands Protection Act (WPA).

Greening Greenfield, a group of concerned citizens working with residents businesses and City government to build a more resilient and sustainable community, have an ongoing campaign to support pollinators. The group has hosted many events to educate residents on the importance of planting native species to support pollinators, and provides more information on their website about how residents can take action: https://greeninggreenfieldma.org/

Greening Greenfield's Pollinator Campaign Poster

F.4 VERNAL POOLS

Vernal pools are temporary bodies of freshwater that provide critical habitat for many vertebrate and invertebrate wildlife species. Vernal pools are found across the landscape; anywhere that small woodland depressions, swales or kettle holes collect spring runoff or intercept seasonally high groundwater tables. Certified Vernal Pools, those that meet the criteria established by the Natural Heritage and Endangered Species Program, are protected to some extent by the Massachusetts Wetlands Protection Act and are protected by additional state and federal regulations. The City of Greenfield has had two vernal pools certified since the last update to it's OSRP, for a total of four Certified Vernal Pools. All are identified on the Plant & Wildlife Habitat map.

Greenfield has the potential to have many more pools certified. Vernal pools that are certified have the added protection of Massachusetts law, providing a 100-foot buffer and preventing alterations provided that the vernal pools fall within wetland resource areas as defined by the Massachusetts Wetlands Protection Act.

F.5 ANALYSIS OF GREENFIELD'S WATER RESOURCES, VEGETATION, AND WILDLIFE

From this inventory of Greenfield's water resources, vegetation, and fisheries and wildlife, it is clear that Greenfield contains a diverse array of natural areas that have been utilized in the development of the community and for the enjoyment of its citizens since the City's establishment. These resources are also all interconnected, and maintaining the health of all the City's natural areas will help ensure vegetation and wildlife will continue to thrive.

Plants and animals are both critical, inter-related components of the ecosystem in Greenfield. Plants convert solar energy into food. This food supports all animal life. Plants cycle energy through the ecosystem by decaying, by removing carbon, and by shedding oxygen. Plants help moderate temperatures. Plants act as shelter and as food for herbivores, omnivores, and carnivores. It is easy to take plants for granted because they are the backdrop for our daily activities. Fields, a maintained stage of human-caused vegetation, are important wildlife habitat for many species.

The information provided throughout this section also emphasizes the importance of forests in Greenfield: they protect aquifers, first and second order streams, and edge and interior habitats; they clean the air and cleanse the water; and they can provide materials, food, and medicines to support our human community. They provide habitat for rare, threatened, and endangered plant species that have the potential to disappear with the loss of forestland. Forests also sequester and store carbon, which is essential to mitigate the effects of climate change. Forests of all types, densities, ages, and sizes, are what would predominate in our absence. Therefore, the multiple values of the forest should be considered in land use decisions with a goal of maintaining as much forestland as possible.

The common element between wetlands, streams and brooks, ponds, and groundwater wells is obvious; it is water. Keeping that water clean everywhere in Greenfield is very important to residents. The permanent protection of forests from development will do much towards ensuring that brooks and streams will continue to be home to a diverse array of plants and animals and that the associated wetlands will continue to exist to help slow floodwater energy. Greenfield's water bodies also contain special natural communities important to the region's biodiversity and climate resilience.

Warming temperatures and changes in precipitation due to climate change, including heavier precipitation events and more rain in the winter, pose threats to Greenfield's water resources. Conserving, and in some cases restoring, natural areas is key to maintaining the quantity and quality of Greenfield's water into the future. This may be accomplished through a combination of strategic land conservation and management, resident and landowner education, and revisions to Greenfield's land use regulations.

The most important areas to protect within Greenfield include those identified on the *Plant & Wildlife Map* as Priority Habitats for Rare & Endangered Species and BioMap2 Core Habitat. These regions include a broader area than site specific locations where rare, threatened, and wildlife species have been located, as they are a wider habitat area that supports such species. Any land use activities should

include consideration of the identified locations of these species as well as their surrounding habitat that is crucial to support continued survival.

G. SCENIC RESOURCES AND UNIQUE ENVIRONMENTS

The characteristics that allow a visitor to distinguish Greenfield from other towns in the region may be different than the unique qualities and special places that only residents can really know. This section identifies the scenic resources and unique environments that most Greenfield residents would agree represent the essence of Greenfield's character. In many ways the history of Greenfield--how people came to settle the land, use its resources, and enjoy its forests, streams, and bodies of water--can be seen in the landscapes that have retained a sense of the past. The unique environments in Greenfield play a very important role in providing residents with a sense of place. Brooks, mountains, wetlands, and City centers provide markers on the landscape within which we navigate our lives.

Scenic landscapes often derive their importance from location relative to other landscape features. The purpose of inventorying scenic resources and unique natural environments in Greenfield is to provide a basis for setting resource protection priorities. To this end, this section includes information about the different values associated with each scenic resource and natural environment, and indicates areas where multiple values are represented in one landscape (See Table 4-4 and the Scenic Resources & Unique Environments Map). Those landscapes that contain, for example, scenic, wildlife, and cultural values may be given higher priority for protection than a landscape that contains only one value.

Table 4-4: Significant Scenic/Historic/Natural Landscapes/Environments in Greenfield

Category /Map #	Scenic Resources and Unique Environments	Description	Ecological Value	Recreational Value	Historical / Cultural Value
Scenic Landscapes *Note: This table identifies the scenic resources and unique environments that most Greenfield residents would agree represent the essence of Greenfield's character. While Greenfield's parks and open space are described in Section 5, this table summarizes some of these most notable scenic landscapes, and includes areas not otherwise mentioned in this plan.*					
1	Highland Park	117 acres of permanently protected mostly wooded acres; hiking trails; views of the downtown area; fishing; tennis	**x**	**x**	

Category /Map #	Scenic Resources and Unique Environments	Description	Ecological Value	Recreational Value	Historical / Cultural Value
2	Mohawk Trail Corridor	Native American trail that linked the Connecticut and Hudson Rivers. One of the earliest scenic byways in New England.		**x**	**x**
3	Pocumtuck Mountain Range	In Greenfield, this includes Poet's Seat Tower, Rocky, Mountain, Sachem's Head and Canada Hill. Good views of the City and beyond; vernal pool present	**x**	**x**	
4	Shelburne Mountain	Views to the east of Greenfield and some of the highest points in the City	**x**	**x**	
5	Temple Woods	56 acres of permanently protected mostly wooded acres; hiking trails; views of downtown and surrounding area; ecologically importanat	**x**	**x**	**x**
6	Upper and Lower Meadows	Agricultural landscape abundant with prime farmland soils	**x**	**x**	**x**
Archeological, Historic or Cultural Areas *Note: A complete list of properties listed on the National Register of Historic Places is available at www.nps.gov/subjects/nationalregister/index.htm*					
7	Crossroads Cultural District	A hub of arts, music, history, and culture, as well as goods and services, this area is originally the crossroads of the Boston-Albany and Montreal-New York travel ways			**x**
8	East Main - High Street Historic District	District roughly bounded by Church, High, East Main and Franklin Streets. This is a historic area and is primarily residential. On the National Register of Historic Places.			**x**
9	Franklin County Fairgrounds	Home of the first agricultural fair in the country. On the National Register of Historic Places		**x**	**x**

Category /Map #	Scenic Resources and Unique Environments	Description	Ecological Value	Recreational Value	Historical / Cultural Value
10	Kells Pasture Site	Native American archaeological site along the Connecticut River. Up to five periods of Late Archaic Native American occupations identified in the soils of the site.www.graypape.com/project/kells-pasture-site/			**x**
11	Main Street Historic District	Includes several blocks of Main Street, from Chapman Street to Franklin Street, as well as Bank Row. On the National Register of Historic Places.			**x**
12	Riverside Archaeological District	Site of Native American encampments. On the National Register of Historic Places			**x**
13	City Common	Historical monuments, location of City festivals and activities		**x**	**x**
14	Wissatinnewag/White Ash Swamp	Historic Native American Village	**x**		**x**
Unusual Geologic Features					
15	Armored mud balls	Rare throughout the world, these geological formations can be viewed at the Greenfield Community College Geology Path			**x**
16	Basalt columns	Located along Rocky Mountain and the Pocumtuck range	**x**	**x**	**x**
17	Dinosaur Footprints	Occasionally visible in the lava ridge slopes along the Connecticut River			**x**
Unique Environments					
18	Connecticut River	Kayaking and canoeing; powerboating; fishing; BioMap2 Core Habitat, Priority Habitat for Rare & Endangered Species	**x**	**x**	

Category /Map #	Scenic Resources and Unique Environments	Description	Ecological Value	Recreational Value	Historical / Cultural Value
19	Deerfield River	Kayaking and canoeing; fishing; BioMap2 Core Habitat, Priority Habitat for Rare & Endangered Species	**x**	**x**	
20	Green River	Green River Swimming and Recreation Area; BioMap2 Core Habitat, Priority Habitat for Rare & Endangered Species	**x**	**x**	

City of Greenfield Open Space & Recreation Plan 2021

Scenic Resources & Unique Environments

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Franklin Regional Council of Governments

H. Environmental Challenges

The overarching environmental challenge for Greenfield's community is climate change, as discussed throughout this section. Temperature changes and precipitation changes are anticipated to impact the City's water resources, forests, farms, and wildlife in a myriad of ways. In addition to this significant challenge, there are several other environmental challenges identified by the Massachusetts Division of Conservation Service as required in this plan. These challenges are described in this section along with efforts that the City either has already implemented or may want to consider in order to address these issues.

H.1 ENVIRONMENTAL EQUITY & ENVIRONMENTAL JUSTICE

Environmental Justice is based on the principle that all people have a right to be protected from environmental pollution and to live in and enjoy a clean and healthful environment. The Environmental Justice Executive Order No. 552 requires EEA agencies to take action in promoting environmental justice. The Executive Order requires new environmental justice strategies that promote positive impacts in environmental justice communities and focus on several environmental justice initiatives. EJ communities are defined as being low income, having a high minority population, and/or to have a high rate of English language isolation, based on the 2010 U.S. Census data.

According to the MassGIS Environmental Justice Viewer[48], Greenfield has three Census block groups that are EJ populations based on income, and are primarily based in the City's urban core. The population in these three EJ block groups is 3,438 or approximately 20% of the City's population. Equitable access and use of the City's open space and recreation facilities for residents of all ages, socioeconomic backgrounds, ethnicities, and physical abilities is an important part of meeting the open space and recreation needs of the community.

Currently, Greenfield enjoys a relatively even geographic distribution of conservation lands and open space, with certain high use recreation and community event areas centrally located in the urban core. However, the City would like to increase the amount of local neighborhood parks, especially areas with facilities for families; expand active recreational land close to population centers; and increase connectivity of conservation and recreation lands so that pedestrians can access these areas without driving. The Open Space Committee devised relevant Action Items related to these interests, which are included in Section 9 of this plan. For example, the Committee is particularly interested in identifying areas where neighborhood parks could be built, and increasing biking opportunities, as public transportation to open space and recreation facilities is limited. In years past the City has tried to work with the Franklin Regional Transit Authority (FRTA) to increase bus routes from the downtown area to

[48] http://maps.massgis.state.ma.us/map_ol/ej.php

recreation areas, but none have been developed due to a lack of funding. The City will continue to work with the FRTA to create additional routes and identify sources of funding.

Equitable access to recreation facilities for all residents presents an opportunity for improvement. The City is committed to making facilities accessible, and has identified several specific projects during the development of this plan, such as prioritizing ADA accessibility improvements at existing open space sites. Finally, as changing demographics present more non-English speaking residents, it may be necessary to consider mixed-language signage for open space and recreation areas.

In 2016, the Department of Conservation and Recreation funded a project to inventory street trees in Greenfield and support new plantings. Findings presented in the report detailed several streets within EJ areas have few or no street trees. Street trees are known to provide benefits such as mental wellbeing, higher property values, and lower cooling costs due to the naturally provided shade. This project ultimately supported plantings in EJ areas, and urged the City to consider additional plantings in EJ areas when possible. The Greenfield Tree Committee planting plan includes a focus in EJ neighborhoods.

One EJ area not identified on the map is Leyden Woods residential development. This housing complex offers low-income and affordable housing. When The Community Builders (TCB) assumed ownership of the property in 1996, a part of the agreement was to dedicate a portion of the land to the City for Open Space and Recreation. This area became known as Leyden Woods Conservation Land and is located behind the current residential development. This open space area provides a direct point of access for passive recreational opportunities for the low income and minority populations residing at Leyden Woods. In 2011, Leyden Woods Apartments also received an award for Outstanding Turnaround of a Troubled Property.

H.2 FLOODING, EROSION, AND SEDIMENTATION

As previously outlined in the *Flood Hazard Areas* section of this chapter, the City's 2020 Hazard Mitigation Plan outlines numerous areas where flooding is an issue. The majority of the flooding occurs along the flat, low area of the Green River from Nash's Mill Road south to the mouth of the Deerfield River and in the Connecticut River Valley.

Tropical Storm Irene, which occurred in 2011, serves as a dramatic example of the impacts of flooding on the City. Some of the impacts from Irene include silt and debris deposited on farm fields, crop and farm product losses, minor to complete loss of topsoil, and damage to infrastructure such as irrigation equipment and greenhouses. Additionally, high groundwater is also a long-term problem and many residents in Greenfield deal with increases in runoff, high water tables, and basement flooding. The wastewater treatment plant in Greenfield is located in the 100-year floodplain of the Green and Deerfield Rivers. When Tropical Storm Irene's flood waters reached 142 ½ feet, water inundated the wastewater treatment plant, which was flood-proofed to elevation 140 feet. As a result of this event, a round of upgrades at the plant was completed in 2014 to raise the flood doors 144.3 ft.

The City's Hazard Mitigation Plan also recommends implementing resiliency projects along the mapped Green River Corridor and Fluvial Erosion Hazard (FEH) zones, which are areas along rivers and streams that are susceptible to bank erosion caused by flash flooding. Rivers and streams alter their course by erosion of their banks and the deposition of sediments. This natural process can be accelerated and exacerbated by human activities that increase stormwater runoff, alter river banks and vegetation, and impact aquatic and riparian habitat. Roads, property, and infrastructure can be threatened by eroding river banks. In addition to property and infrastructure damage, sediment from eroding banks can compromise habitat for fish and aquatic life. One location within the City that has been noted to have significant issues with erosion is the bank on the west side of the Green River at the Municipal Swimming and Recreation Area. The City is hoping to address this issue soon through a bank stabilization project.

H.3 GROUND AND SURFACE WATER POLLUTION

Non-point source pollution occurs when pollutants are generated not by a single source like an outflow pipe from a factory but from improper land use across landscapes both suburban and rural. For example, Greenfield residents can unknowingly contaminate groundwater by failing to update their private septic systems to limit leaching into rivers and streams and by improperly disposing of household hazardous materials like petroleum products, wood preservatives, and pesticides.

Non-point source pollution can result in the contamination of both surface and groundwater and involve other types of pollution. Sources of pollution thought to be of greatest concern to residents include the improper use and disposal of hazardous chemicals, other hazardous wastes, road salt, siltation from new construction, gravel roads, and the use of herbicides along utility right-of-ways.

Non-point source pollution in Greenfield can impact the City's drinking water supply. There is a direct link between above ground land use and below ground water quality. For example, lawns actually facilitate the movement of rainwater across the ground's surface instead of providing an easy entry point to the soil. Pavement produces even more runoff because it is impervious. Normally, as a community grows the amount of impervious surfaces increases. When precipitation runs off a surface like asphalt, the rainwater may pick up and carry contaminants into streams, ponds, lakes, and into the groundwater. Some of the groundwater moves through subsurface soil layers into streams, while other seeps down into aquifers.

The City's Subdivision Rules and Regulations encourage the use of Low Impact Development in all subdivisions, and the City's zoning regulations were recently updated to require green space and tree planting in parking lots. The City could benefit from an effort to try to minimize the amount of impervious cover and find ways of diverting storm water runoff to retention areas so sediments and highway related pollutants can settle out before being transported to surface and ground waters. For example, as noted in the City's Sustainable Master Plan, the City could upgrade municipal parking lots using LID design to reduce runoff.

As noted above in the section on Aquifer Recharge Areas, the groundwater supply in Greenfield is adequately protected. The City has worked to conserve parcels of land surrounding the City's well sites, such as the Maple Brook Farm.

Impaired Water Bodies

Impaired water bodies in the City of Greenfield can be viewed with the 2014 Integrated List of Waters Map Viewer[49].

H.4 HAZARDOUS WASTE AND BROWNFIELD SITES

As defined by the U.S. Environmental Protection Agency (EPA), "Brownfields" are properties that the expansion, redevelopment, or reuse of may be complicated by the actual presence or perceived potential presence of a hazardous substance, pollutant, or contaminant. Greenfield has been working with the Franklin Regional Council of Governments and property owners to assess the extent of contamination and promote redevelopment of identified Brownfield sites in the City. Recent successful redevelopment projects include the former Toyota of Greenfield site and former HAPCO auto parts store on Olive Street, which is now home of the John W. Olver Transit Center and Olive Street Parking Garage, and the former Lunt Silversmith complex on Federal Street, which is now home to health and human service organizations and a recovery treatment center.

Other sites, like the former Bendix property off of Laurel Street and 34 Riddell Street, are former industrial sites that have been acquired by the City for the purpose of ensuring remediation of hazardous materials and encouraging productive reuse of the site. For the Bendix site, long term monitoring by the previous owner continues and in 2011 the EPA conducted an emergency action to remove containers with hazardous substances. The City has since demolished the structure and the cleared the site. The City is currently working with an interested buyer to redevelop the site for cannabis cultivation. Through the FRCOG Regional Brownfields Program, the building at 34 Riddell Street is being assessed for the potential presence of hazardous substances, such as asbestos, lead, PCB and more. The resulting Phase II environmental site assessment report will describe if there hazardous substances are present and, if so, the extent of contamination. With this information, a remediation plan can be developed as well as strategies for funding its cleanup.

Brownfield sites have the potential to negatively impact public health, natural resources and economic opportunities. Identifying sites that have a historical commercial or industrial use or current conditions that may result in contamination is important. From there, environmental site assessments should be conducted to determine if there is contamination, and if there is, what is it and the extent of it present. This information supports successful remediation and provides more predictability for potential

[49] http://maps.massgis.state.ma.us/images/dep/omv/il2014viewer.htm

redevelopers. There are programs to the assist the City at the county, state and federal levels in addressing these sites.

H.5 IMPACTS OF DEVELOPMENT

One type of non-point source pollution that is more common in an urbanizing landscape is the result of poor site management during new home construction. During a storm event, rainwater traveling over land can erode soil uncovered in the construction process. In addition, after construction, stormwater runoff from seeded and fertilized soils can load nearby streams and wetlands with excessive nitrogen and phosphorus. Fortunately, this is a well-recognized problem in the country and in the state. The Massachusetts DEP provides ample erosion and sediment control guidelines via their website (http://www.state.ma.us/dep/brp/stormwtr/files/esfull.pdf). The goals of construction site Best Management Practices (BMPs) can include:

- Maintain average volumes and peak runoff rates after construction at levels similar to predevelopment levels;
- Ensure that annual loadings of total suspended solids after construction are no greater than predevelopment rates;
- Retain sediment on-site during construction; and
- Reduce the amount of nitrogen, bacteria, and phosphorus that leave the site.

Some BMPs during construction including phased grading, seeding of stockpiles, vegetation of open space, cross-grading, and sediment detention swales can help to reduce runoff and improve water quality. After construction, other BMPs can help to deter stormwater runoff using features such as pervious driveway surfaces, landscape plantings, reduced roadway widths, roadside swales, detention swales and a cul-de-sac detention basin.

Section 3 describes the current development threats along with the regulatory work that the City is interested in undertaking to assess existing zoning and develop strategies for directing growth to areas of the City with existing infrastructure and away from sensitive resource areas, including the 2014 Housing Plan.

H.6 TRASH

Many of the open space sites throughout Greenfield have faced problems with illegal dumping, disposing of trash, and littering. Since the writing of the last plan, the Recreation Department has added trash cans and dog waste receptacles at every site where the DPW picks up trash.

As expressed through the survey responses gathered for this plan, community members have heightened concerns about the amount of trash throughout Greenfield's parks and open space sites, including dog waste that is still present at parks. Items have been added to the Seven-Year Action Plan to address these issues. The DPW and the Recreation Department will seek funding and identify ideal locations for new trash receptacles along with dog waste stations.

H.7 INVASIVE SPECIES

Invasive species, or exotics, are plants that are 'non-native' to our local ecosystem. These plants have the ability to spread rapidly and displace native species. In some cases they can cause extinction but generally they decrease biodiversity, alter habitats, and limit resources. Once they invade an ecosystem, it creates the need for time consuming and expensive weed management.

Climate models project rising temperatures and increased precipitation in the Northeastern United States in coming years, which is likely to impact local forests as well other vegetation and public health partially as a result of related impacts on pests, pathogens, and nuisance species. Periods of rapid climate change, such as we are presently experiencing, are especially favorable for rapidly reproducing species such as insects and diseases and promote conditions that can enhance the spread of problematic species. By contrast species with longer life cycles, such as trees, are inherently less well equipped to adapt to rapid climate change.

The following Table 4-3 is a list of invasive species that have been documented in Greenfield by the Franklin County Flora Group as of March 2019.

Table 4-5: Invasive Species Observed in Greenfield

Latin Name	Common Name
Acer platanoides	Norway Maple
Aegopodium podagraria	Bishop's goutweed
Ailanthus altissima	Tree of heaven
Alliaria petiolata	Garlic mustard
Berberis thunbergii	Japanese barberry
Celastrus orbiculatus	Oriental / Asian bittersweet
Cynanchum louiseae	Black swallow-wort
Elaeagnus umbellata var. parvifolia	Autumn olive
Euonymus alatus	Burning bush
Fallopia japonica var. japonica	Japanese knotweed
Frangula alnus	European buckthorn
Hesperis matronalis	Dame's rocket
Iris pseudacorus	Yellow iris
Lonicera japonica	Japanese honeysuckle
Lonicera morrowii	Morrow's honeysuckle
Lysimachia nummularia	Creeping jenny / moneywort
Lythrum salicaria	Purple loosestrife
Myriophyllum heterophyllum	Two-leaved water-milfoil
Myriophyllum spicatum	Spike water-milfoil
Phalaris arundinacea	Reed canary-grass
Phragmites australis ssp. australis	Common reed

Latin Name	Common Name
Polygonum perfoliatum	Mile-a-minute vine or weed
Potamogeton crispus	Crisped pondweed
Ranunculus ficaria	Fig buttercup
Rhamnus cathartica	Common buckthorn
Robinia pseudoacacia	Black locust
Rosa multiflora	Multiflora rose

All of these species can be troublesome and difficult to control once planted. Norway maples have beautiful foliage, but in some towns in the southwestern portion of the state, they have replaced native Sugar maples as the dominant forest tree. Norway maples pose a threat to the biodiversity of the City's forests, as they are known to develop dense stands that outcompete native plants. As noted in the section above on the City's street trees, it is imperative that the City continues to plant native species, which will better support pollinators, insects, birds, and mammals.

Japanese knotweed dominates vegetation on Country Club Road. Photo credit: Mary Chicoine

The City would be wise to take a proactive approach to environmental problems related to the spread of introduced pests, including invasive species, and stay abreast of the latest information about related problems that may impact local vegetation, agriculture, forestry wildlife, and public health, as well as related strategies for sustainable management. Such efforts will require cooperation with state and regional efforts and may involve several City boards and departments including the Open Space Committee, the Health Department, and the Conservation Commission, as well.

SECTION 5

INVENTORY OF LANDS OF CONSERVATION AND RECREATION INTEREST

This section of the Greenfield Open Space and Recreation Plan identifies parcels of undeveloped land that are individually, or taken together, considered to be of interest because they help conserve wildlife habitat, scenic landscapes, the area's character, and current and potential recreational resources for Greenfield's residents. Large areas of un-fragmented open space also provide ecosystem functions such as carbon sequestration, water filtration and flood protection, and corridors for plant and wildlife migration, which are all critical for mitigating and adapting to the impacts of a changing climate. Lands of conservation interest are those parcels of land that are considered important because they are already protected from development or because they could be a priority for protection.

When land is considered protected there is a legal restriction that does not permit the parcel to be developed for residential, commercial, or industrial uses. Permanently protected land enjoys the highest degree of protection from development. The only way that permanently protected land can be developed is if two thirds of the State legislature was to vote to change the use of the land as outlined in Article 97 of the Amendments to the Massachusetts State Constitution. In Massachusetts, there are a number of ways in which land can be considered permanently protected from development: a conservation restriction can be attached to the deed, or the land may be owned by a state conservation agency or non-profit conservation organization, a conservation land trust, or a municipal conservation commission. The "permanent protection" conveyed by Article 97 does have its limits. The state legislature has voted to release this protection at the request of local communities, so that conservation land can be used for schools, roads, economic development, or other public projects not related to resource protection.

The inventory accompanied by the Open Space Map shows the location, types, and distribution of conservation lands in Greenfield. This inventory is divided into two main sections based on type of ownership: 1) private (including non-profit conservation organizations) and 2) public. Within each of these major categories, parcels are differentiated by use (farm or forestland), by ownership, and by level of protection: permanent, limited, and temporary *(See Table 5-1).*

Table 5-1: Summary of Protected Open Space in Greenfield

PROTECTED OPEN SPACE	Area in Acres	Percentage of Greenfield's Total Land Area (14,020.00 acres)
PRIVATELY OWNED FARMLAND		
Permanently Protected (APR)	1,136.50	8%
Temporarily Protected under Chapter 61A	935.42	7%
Total Privately owned Protected Farmland	**2,071.92**	**15%**
PRIVATELY OWNED PROTECTED OPEN SPACE		
Permanently Protected by Conservation Restriction	239.54	2%
Temporarily Protected under Chapter 61	623.23	4%
Temporarily Protected under Chapter 61B	742.88	5%
Total Privately Owned Protected Open Space	**1,606.44**	**11%**
TOTAL PRIVATELY OWNED PROTECTED OPEN SPACE	**3,678.36**	**26%**
PUBLICLY OWNED PROTECTED OPEN SPACE		
Land Permanently Protected by State and Federal Conservation Agencies	188.39	1%
Land Permanently Protected by Greenfield Conservation Commission/City of Greenfield	799.70	6%
Land with Limited Protection by the City of Greenfield	213.78	2%
TOTAL PUBLICLY OWNED OPEN SPACE	**1,207.87**	**9%**
TOTAL PROTECTED OPEN SPACE	**4886.23**	**35%**
TOTAL PERMANENTLY PROTECTED OPEN SPACE	**2364.13**	**17%**
TOTAL OPEN SPACE WITH TEMPORARY PROTECTION	**2301.53**	**16%**
TOTAL OPEN SPACE WITH LIMITED PROTECTION	**213.78**	**2%**

Source: Greenfield Assessors Records and Maps, FY2020.

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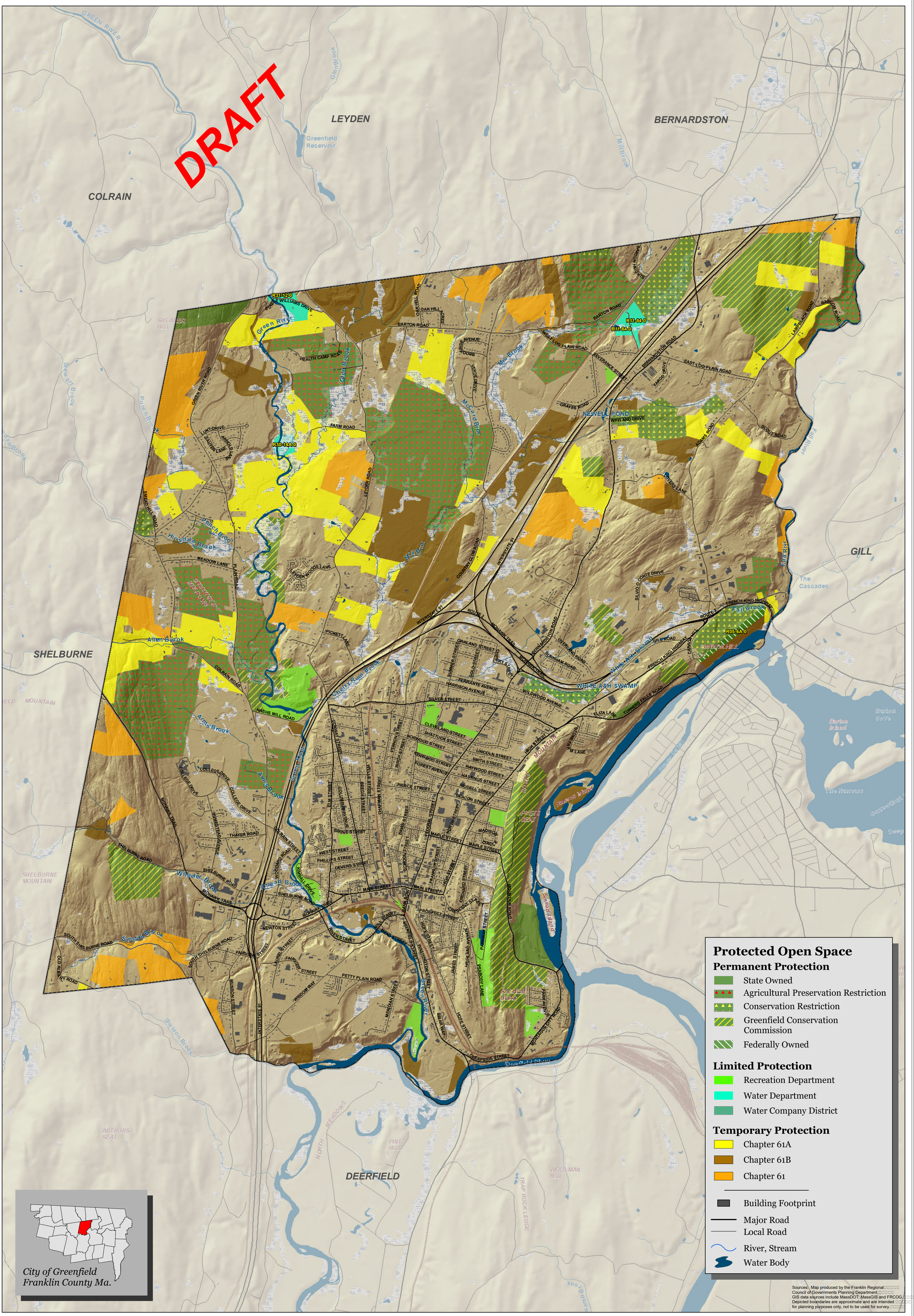

Protected Open Space

Permanent Protection

- State Owned
- Agricultural Preservation Restriction
- Conservation Restriction
- Greenfield Conservation Commission
- Federally Owned

Limited Protection

- Recreation Department
- Water Department
- Water Company District

Temporary Protection

- Chapter 61A
- Chapter 61B
- Chapter 61

- Building Footprint
- Major Road
- Local Road
- River, Stream
- Water Body

City of Greenfield
Franklin County Ma.

Sources: Map produced by the Franklin Regional Council of Governments Planning Department. GIS data sources include MassDOT, MassGIS and FRCOG. Depicted boundaries are approximate and are intended for planning purposes only, not to be used for survey.

City of Greenfield Open Space & Recreation Plan 2020

Open Space Inventory

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A.1 PERMANENTLY PROTECTED LAND

Land permanently protected from development may be owned by a state agency or by the City. For example, the Kells Farm Property is owned by the Commonwealth of Massachusetts, and is under the management of the Department of Conservation and Recreation (DCR). Land owned by the City of Greenfield under the authority of the Conservation Commission is also considered to be permanently protected from development under Article 97 regulations, which requires a two-thirds majority vote of the State Legislature to convert open space to another use.

Farmland can be permanently protected from development when a landowner chooses to sell their development rights to a land trust or state agency. The Massachusetts Department of Agricultural Resources (MDAR) purchases the development rights of farmland through their Agricultural Preservation Restriction (APR) Program. The APR Program typically pays the landowner the difference between the market value and the agricultural value of the land**.** MDAR favors towns that provide matching funds, which are typically 5 percent of that amount or up to $500 per acre. Greenfield's Community Preservation Act Funds (which the City adopted in November 2020) could be used as a match for this program. In this way, cities and towns can leverage 95 percent of the cost of purchasing development rights towards protecting the farmland of willing landowners. Currently there are several farms in the APR program in Greenfield, with a total of 1,136 acres of permanently protected farmland. This is a significant increase from the 745 acres of land conserved through the APR program at the time of the last Open Space and Recreation Plan update.

A.2 TEMPORARILY PROTECTED LAND

Land considered to be of limited protection includes any City-owned open space that is not under the authority of the Conservation Commission. Examples of City-owned open space include small parks, vacant lots, and playgrounds. In Greenfield, temporarily protected City-owned properties include land around buildings such as the City Hall, as well as local parks and playgrounds such as Hillside Park.

The Chapter 61, 61A and 61B lands are also considered to have a temporary level of protection from development. The Chapter 61 programs offer a reduced tax assessment on privately owned working land. Landowners that choose to participate in this program therefore receive a reduction in property taxes on the portion of their land that is in active production as agriculture or forestland, or available for public recreation. There are three Chapter 61 programs: Chapter 61 for Forestry, Chapter 61A for Agriculture, and Chapter 61B for Recreation.

In order to participate in the Chapter 61 Program, landowners must manage 10 or more contiguous acres of forestland under a ten-year management plan. The aim of this program is to temporarily keep working forests undeveloped.

In order to participate in the Chapter 61A program, a landowner must have at least 5 acres of land currently in active agriculture, and apply every year to enroll their parcels of land in the program. The aim of this program is to temporarily keep farmland in active agricultural production.

The Chapter 61B program also promotes the private ownership of open space, with the requirement that land enrolled in the program be used for public and private recreation purposes, or as open space. No management plan is required, but the tax savings are significantly smaller. Commercial timber harvesting is not allowed on lands in the Chapter 61B program.

Lands in the Chapter 61 program are considered to be only temporarily protected because a landowner may remove land that is enrolled in the Chapter 61 Program at any time by paying a penalty tax. If the landowner receives a formal offer from another party to purchase a parcel of land that is currently in one of the Chapter 61 Programs (61, 61A, 61B), the landowner must notify the City. The City then has 120 days to exercise its right of first refusal by matching the bona-fide offer, or to transfer this right to a conservation organization.

The ability to transfer the right of first refusal to a conservation organization enables the City to create more protected open space without being burdened by the relatively short time frame for action. Private conservation land trusts often have the ability to produce creative and successful fundraising campaigns in short periods of time, while DCR and the Massachusetts Division of Fisheries and Wildlife (MassWildlife) may be interested in purchasing the land in the near future. While it may be difficult to bring a decision on a land purchase within 120 days, the negotiating process between a land trust, a state conservation agency, and a landowner can be often completed in a shorter period of time. It is therefore helpful for City officials and/or committees to maintain established relationships with conservation organizations such as DCR, MassWildlife, and local land trusts such as the Franklin Land Trust and Mount Grace Land Conservation Trust.

B. PRIVATE & NON PROFIT PARCELS

Approximately 3,680 acres in Greenfield is privately owned protected open space. Most of this land is either forested or in use for agriculture. There are many advantages to private ownership of open space. Privately owned open space contributes to the City's tax base. Some landowners allow access to their property for recreational purposes. Most take pride in their land, which favors good stewardship. Finally, owning land gives people a sense of place. This is particularly true of residents whose families have owned land in Greenfield for generations. Land ownership encourages a sense of community and helps contribute to community stability over time. Privately owned land provides many public benefits, but it is important to respect

private property rights and to remember that landowners ultimately determine use and disposition of this land.

The major disadvantage of private ownership of open space is that most privately owned land can easily be converted to other uses. Sixty percent of privately owned open space in Greenfield has been permanently protected through APR or CR. The remaining forty percent of privately owned lands are only temporarily protected, and are therefore vulnerable to development. Some landowners acquire land specifically for the purposes of development, but others are forced to sell property due to circumstances beyond their control. Aging, the death of a parent or spouse, lack of a farm transition or estate plan, financial needs of family and rising costs or declining profits of farming and forestry are common reasons why landowners decide to put their property on the market. The high value of land for residential development is both a powerful incentive to sell property, and a formidable obstacle to people who might otherwise want to buy it for agriculture or forestry. They are discussed in this Open Space and Recreation Plan because privately owned open space may contain important wildlife habitat, offer unique recreational opportunities, or provide a potential connection between other permanently protected parcels. In some cases, parcels may be deemed valuable enough by the community to consider purchasing, if available for sale, or helping to protect through conservation easements or other options.

The following tables show temporarily protected, privately owned agricultural and forest land in Greenfield identified by assessors' map and lot numbers. Some of this privately owned land is in pasture but most is in forest. These open space parcels are still on the tax rolls, whether the land is permanently protected or not. Many landowners have taken advantage of the Chapter 61 programs as evidenced by the fact that there are 2,304 acres of open space (16 percent of the total land area) in the 61A, 61B and 61 Programs combined.

In the following tables, Privately Owned Agricultural, Recreational, and Forest Lands are listed by level of protection from development. The ownership of the land is provided with the associated assessors map-lot number and acreage. The current use is based on the vegetation. Farmland may be pasture in Greenfield, while forest is presumed to be used as such, whether it is managed for timber or not. Public access on private land may not be permitted, and if it is, is subject to change. State conservation agencies often require some level of public access before paying for, or accepting conservation restrictions. Public access is not a requirement for enrollment in any of the Chapter 61 programs including the Chapter 61B Recreation Program. It is assumed that given the nature of these open space parcels, access to them by people with disabilities is also not guaranteed.

Important characteristics that could motivate the City to consider acting on their right of first refusal for a Chapter 61 parcel, or negotiating with a willing landowner for a fair purchase price, may include the presence of prime farmland soils, pasture, wetlands, a portion of the land that

is above an aquifer, or rare or endangered species habitat. In addition, the parcel may be deemed very important as a link in a potential greenway or trail network, or as a component of a large block of contiguous forest.

B.1 PRIVATELY OWNED AGRICULTURAL LAND

According to the Greenfield Assessor's records, 1,136 acres of agricultural land, or 8 percent, of total land area in the City is permanently protected under APR (Table 5-2), while 935 acres of land, or 7 percent, of total land area in the City is temporarily protected by being enrolled in the Chapter 61A program (Table 5-3).

Table 5-2: Permanently Protected by Agricultural Preservation Restriction (APR)

Map-Lot	Acres	Current Conditions (If Known)
R05-19-0	31.83	Farming - Hay, Grain
R08-14-0	12.72	
R09-1A-0	37.92	
R11-85-0	0.47	
R16-6A-0	103.53	Farming - Tobacco Sod, Vegetables, Tillable, Non-Productive Woodland
R17-11A-0	28.72	
R18-4-0	43.13	
R18-5-0	22.00	
R18-6-0	54.07	
R21-1-0	232.00	
R26-30-0	22.52	
R26-7A-0	14.24	
R27-3-0	13.18	
R28-31-0	78.00	
R28-32-0	5.30	Farming - Vegetables
R28-33-0	8.30	Farming - Vegetables
R30-13-0	63.43	
R31-1-0	61.05	Farming - Vegetables
R34-101-0	10.75	Farming - Hay, Grain
R35-2-0	19.51	
R35-23A-0	22.20	
R35-31-0	50.56	
R36-7A-0	136.15	
R36-9-0	64.92	
Total acres	**1,136.50**	

Table 5-3: Privately Owned Agricultural Land with Limited Protection from Development (61A)

Map-Lot	Location	Acres
R39-3B-0	OLD ALBANY RD	1.42
R36-10-0	620 COLRAIN RD	20.17
R36-6-0	COLRAIN RD	19.23
R05-8-0	FACTORY HOLLOW	1.55
R23-37-0	207 LEYDEN RD	28.00
R05-17-0	FACTORY HOLLOW	1.92
R05-15-0	FACTORY HOLLOW	0.25
R35-9-0	OLD GORGE RD	13.70
R35-7-0	637 COLRAIN RD	32.00
R35-11-0	COLRAIN RD	21.52
R35-23B-0	PLAIN RD	0.70
R23-32-0	LEYDEN RD	0.48
R05-22-0	FACTORY HOLLOW	1.10
R36-10C-0	COLRAIN RD	1.29
R36-10A-0	OLD GORGE RD	1.00
R36-10D-0	OLD GORGE RD	1.66
R05-7-0	FRENCH KING HW	1.54
R16-6-0	446 COUNTRY CLUB RD	10.00
R13-7A-0	878 BERNARDSTON RD	57.00
R22-16A-0	365 LEYDEN RD	11.50
R34-14-0	311 PLAIN RD	13.70
R34-13-0	318 PLAIN RD	7.80
R29-1-0	308 LEYDEN RD	13.71
R29-4-0	340 LEYDEN RD	53.82
R33-13B-0	SMEAD HILL RD	15.91
R22-18B-0	REAR LEYDEN RD	8.83
R22-18-0	287 LEYDEN RD	26.99
R15-8-0	301 COUNTRY CLUB RD	11.15
R34-41A-0	REAR GREEN RIVER RD	4.00
R34-38-0	76 GREEN RIVER RD	9.60
R29-4C-0	LEYDEN RD	10.50
R33-3-0	PLAIN RD	90.00
R34-25-0	156 GREEN RIVER RD	19.69
R22-16-0	325 LEYDEN RD	9.40
R12-9-0	975 BERNARDSTON RD	9.53
R07-2-0	ADAMS RD	30.90
R07-8B-0	ADAMS RD	18.13

Map-Lot	Location	Acres
R20-4A-0	BARTON RD	32.92
R20-9-0	140 BARTON RD	28.66
R08-11A-0	LAMPBLACK RD	11.20
R08-12D-0	566 LAMPBLACK RD	7.45
R08-8A-0	504 LAMPBLACK RD	9.10
R30-2-0	LEYDEN RD	112.92
R31-6A-0	56 GLENBROOK DR	17.61
R08-12-0	588 LAMPBLACK RD	11.63
R32-5-0	443 GREEN RIVER RD	22.71
R09-12-0	LAMPBLACK RD	41.40
R31-8-0	22 EUNICE WILLIAMS DR	14.01
R08-11-0	599 LAMPBLACK RD	6.87
R09-6A-0	LAMPBLACK RD	7.82
R36-10B-0	OLD GORGE RD	23.62
R09-6-0	LAMPBLACK RD	7.81
Total Acres	**935.42**	

Much of the land enrolled in Chapter 61A also abuts rivers and streams, such as the Green River or Mill Brook. While agriculture can have negative impacts on water quality, these impacts can be reduced or avoided through the use of best management practices. When best management practices are observed, agriculture is compatible with watershed protection because it keeps the land open, while development results in conversion of land to impervious surfaces with negative impacts on water quality.

Agricultural lands enrolled in the Chapter 61A program continue to be used as farmland and the majority lie within the City's Rural Residential district, and some fall within the Suburban Residential district. No state, City, or private funds are necessary to enroll the land in the program. Chapter 61A lands offer much value to the City, even if the farmlands are only "temporarily protected." The agricultural parcels often contain prime farmland soils, contribute to the City's tax base and generate revenue, employment, and food products. In addition, some landowners may allow access to their property for recreational purposes, such as hiking and birdwatching. However, access should not be assumed, as the land is privately owned. Most Chapter 61A landowners take pride in their land, while practicing good stewardship. They help to define a sense of place for Greenfield and contribute to community stability over time.

Remaining farms that are not in either the APR Program or the Chapter 61 Program are not listed here, as they are not considered to have any form of protection from development. It is important to note that farms may remain in a family for generations with no formal protection other than a family's desire and ability to keep working the land. However, with development

pressure and unreliable economic and weather conditions that impact farms, it is important for farm families to consider successional planning for the future continuance of their farm. This future planning may involve family discussions to consider land protection options, legal and estate issues, ownership and management of the farm operation, and sharing of assets among successors.

B.2 PRIVATELY OWNED FORESTED LAND

Large blocks of contiguous forest support and sustain woodland species with specialized habitats that can be irreparably lost once a forest is fragmented by roads and development. The following two tables list privately owned forestland with different levels of protection from development. Permanently protected forestland exists when landowners have donated or sold their development rights to a state conservation organization or a land trust. The landowners retain the other rights of ownership and they continue to pay property taxes, though these taxes are lower due to the reduced value of their land. Properties with conservation restrictions may have the potential for passive recreational use, but this is dependent upon the wishes of the landowner. It is important to note that public access cannot be assumed as properties with Conservation Restrictions are privately owned. Greenfield currently has almost 240 acres (2 percent of the City) of privately owned properties that are permanently protected from development with a conservation restriction (see Table 5-4).

Table 5-4: Forestlands with Permanent Protection from Development

Owner	Conservation Restriction	Map/Lot	Acres
FRANKLIN LAND TRUST	Fee	120-15-0	.85
FRANKLIN LAND TRUST	Fee	119-11A-0	10.01
FRANKLIN LAND TRUST	Fee	119-12-0	.8
FRANKLIN LAND TRUST	Fee	121-1A-0	11.10
FRIENDS OF WISSATINNEWAG	CR	R05-6-0	40.76
TRUSTEES OF CATHLEEN ESLEECK & JOHN MURTHA	CR	R34-50-0	6.32
TRUSTEES OF CATHLEEN ESLEECK & JOHN MURTHA	CR	R34-56-0	5.99
PAYSNICK, MICHAEL	CR	R07-8C-0	9.02
KELLEY, NANCY	CR	R12-19-0	60.58
PRATT, WILLIAM	CR	R18-13B-0	8.14
RIVER MAPLE FARMS	CR	R10-6-0	86.76
		Total Acres	**239.54**

Source: City of Greenfield Assessors Records; October 2020.

All of the parcels in Table 5-5 are temporarily protected in the Chapter 61B Recreational Open Space and the Chapter 61 Forestland Classification and Taxation Program, and the degree of protection of these parcels is short term. Shown in Table 5-5 are 1,369 acres (9 percent of the City) of privately owned forestland with temporary protection in Greenfield. There are no public

grants awarded as a result of enrolling in the Program; however, the owner does receive a property tax break over a ten-year period.

Table 5-5: Forestlands with Temporary Protection from Development Enrolled in the Chapter 61 B Recreational Open Space and Chapter 61 Forestland Taxation Program

Location	Chapter Program	Map-Lot	Acres
DEERFIELD ST	61B	14-2-0	3.00
DEERFIELD ST	61B	11-4-0	8.24
OFF WISDOM WAY	61B	R41-28-0	13.99
PETTY PLAIN RD	61B	R41-26A-0	1.58
ALONG GREEN RIVER	61B	R42-3A-0	8.50
OFF DEERFIELD ST	61B	14-3-0	2.30
POWER CT	61B	30-28-0	10.09
538 SHELBURNE RD	61B	R38-2-0	10.06
CT RIVER	61B	R03-17-0	10.99
NASHS MILL RD	61B	R27-26-0	5.98
SILVIO O CONTE DR	61B	R05-24-0	5.83
REAR LEYDEN RD	61B	R23-38A-0	0.54
COUNTRY CLUB RD	61B	R15-2A-0	4.11
FRENCH KING HW	61B	R05-31-0	17.70
OFF RT 2	61B	R23-79A-0	8.65
136 LOVERS LN	61B	R06-5-0	11.69
LOVERS LN	61B	R13-11-0	2.40
REAR BERNARDSTON RD	61B	R13-23-0	8.18
BERNARDSTON RD	61B	R13-25-0	15.09
COUNTRY CLUB RD	61B	R16-9-0	38.92
807 COLRAIN RD	61B	R34-64-0	12.40
180 COUNTRY CLUB RD	61B	R22-1-0	219.02
322 ADAMS RD	61B	R06-9C-0	21.72
50 RAYMOND RD	61B	R12-65-0	59.50
1039 BERNARDSTON RD	61B	R11-2A-0	8.00
GREEN RIVER RD	61B	R32-2B-0	50.28
BASCOMB RD	61B	R08-13-0	6.29
62 BARTON RD	61B	R20-23B-0	12.92
LAMPBLACK RD	61B	R08-12B-0	5.01
761 LEYDEN RD	61B	R31-7-0	41.04
683 LEYDEN RD	61B	R20-27-0	90.03
375 BARTON RD	61B	R19-16B-0	15.72
35 LOG PLAIN RD	61B	R19-17-0	14.04

Location	Chapter Program	Map-Lot	Acres
LAMPBLACK RD	61B	R08-12G-0	2.07
		Subtotal Chapter 61B	**745.88**
REAR MUNSON ST	61	R41-35-0	6.46
S SHELBURNE RD	61	R40-22A-0	1.71
169 OLD ALBANY RD	61	R39-2-0	20.50
349 S SHELBURNE RD	61	R40-21-0	48.01
S SHELBURNE RD	61	R39-1-0	7.04
S SHELBURNE RD	61	R40-23-0	0.51
S SHELBURNE RD	61	R40-20-0	25.09
SHELBURNE RD	61	R37-57-0	10.12
MOHAWK TRL	61	R37-51-0	10.35
MOHAWK TRL	61	R36-15-0	10.33
MOHAWK TRL	61	R36-11-0	11.28
MOHAWK TRL	61	R36-13-0	10.51
REAR LEYDEN RD	61	R28-19C-0	16.65
638 COLRAIN RD	61	R35-8-0	43.61
LEYDEN RD	61	R28-15-0	10.42
170 LEYDEN RD	61	R28-19A-0	4.85
LEYDEN RD	61	R29-9-0	0.73
LOVERS LN	61	R13-26A-0	0.72
FACTORY HOLLOW	61	R06-18-0	11.00
FACTORY HOLLOW	61	R06-17-0	15.20
454 LEYDEN RD	61	R29-12-0	48.00
SMEAD HILL RD	61	R34-92-0	13.80
BERNARDSTON RD	61	R13-27-0	74.90
LOVERS LN	61	R13-15-0	9.15
88 LOVERS LN	61	R13-15B-0	1.44
276 GREEN RIVER RD	61	R33-30-0	89.20
OAK HILL RD	61	R20-17-0	5.01
BARTON RD	61	R19-8B-0	35.00
345 BARTON RD	61	R19-16A-0	37.86
REAR COUNTRY CLUB RD	61	R19-18-0	3.00
REAR COUNTRY CLUB RD	61	R19-18A-0	2.00
LAMPBLACK RD	61	R09-9-0	18.38
817 LAMPBLACK RD	61	R09-8-0	20.40
		Subtotal Chapter 61	**623.23**
		Total Acres	**1369.11**

Source: City of Greenfield Assessors Records; October 2020.

Lands in Chapter 61A and 61 (forestry) are not required to provide public access. Chapter 61B lands in the "natural, wild, or open" category can post their land to exclude public access; however "recreation" lands must be open to public access unless the landowner is an organization with paying members.

B.3 SIGNIFICANCE OF PRIVATE LAND HOLDINGS WITH PROTECTION IN GREENFIELD

Privately owned forestlands offer many values to the community and are important resources for several reasons. Many forestlands are large parcels with a low degree of fragmentation, so wildlife and plant habitats are preserved. When these forestlands are protected from development, they help to protect and provide clean water, air, and healthy wildlife populations. Forest soils have a high infiltration capacity, so they absorb moisture and permit very little surface runoff. Once absorbed, water is released gradually so flooding is reduced during large rain events and streamflow is maintained during low water months. Forests recycle nutrients, so the nutrients do not pass into waterways, and water quality is preserved. Because forest soils are absorptive, soil erosion is reduced and fish habitat is preserved. Forestlands also have a thermal impact on brooks. When trees are removed from stream banks, water temperatures rise and cold water-dependent aquatic species like trout are adversely affected. Many forested lands may also provide recreational value such as fishing, hiking, and bird watching for Greenfield residents, if the owner allows access.

As noted in the Environmental Inventory and Analysis section of this plan, private forests can also play a role in mitigating future climate change by sequestering and storing carbon. However, it should be also be noted that there are currently no financial incentives for landowners who may be interested in conserving their land for the purpose of sequestering and storing carbon through the Chapter programs. The Greenfield Open Space Planning Committee is interested in advocating for the creation of a similar program to promote the conservation of more forested land within the City.

C. PUBLIC PARCELS

State conservation agencies and the City of Greenfield own and manage approximately 10% of Greenfield's land for open space and recreation purposes. However, the City-owned parcels have a low level of protection unless they are under the authority of the Greenfield Conservation Commission. The following inventories include those parcels that are owned by the Commonwealth of Massachusetts and by the City of Greenfield.

C.1 PUBLICLY OWNED OPEN SPACE

Publicly owned open space in Greenfield includes land owned by the Commonwealth of Massachusetts and the City of Greenfield. All of the State-owned land is managed by the

Department of Conservation and Recreation (DCR) or by the Division of Fisheries & Wildlife (DFW).

DCR's lands are located in the southeast portion of the City adjacent to the Rocky Mountain Park; the majority of the land is known as the Kells Farm Property, which runs along the Connecticut River. The Division of Fisheries & Wildlife owns a parcel in the northwest corner of Greenfield. The City of Greenfield also owns a substantial amount of land in the Rocky Mountain Park area through the Conservation Commission, which ensures that this area is permanently protected. Other properties owned by the City are located throughout the urban core of Greenfield and eastern Greenfield, as the majority of land in northwestern Greenfield is used for farming or is privately owned conserved land through one of the Chapter 61 programs.

Table 5-6 lists parcels of permanently protected public land owned by the Commonwealth of Massachusetts or by the City of Greenfield and under the control of the Conservation Commission.

Table 5-6: Publicly Owned Land Permanently Protected from Development

Property Owner/Manager	Site Name	Acres	Map-Lot	Current Use/Conditions	Recreation Potential	Public Access	Zoningklklklklklklklklkl	Type of Grant Received (if any)
Conservation Commission	Gott Land	3.99	32-2-0	Hiking, Nature Study	Formal trail system	Yes	GC	N/A
Conservation Commission	Shelburne Rd. Conservation Land	61.41	R38-1-0	Hiking, Nature Study, Wildlife Habitat Preservation, Watershed Protection	Formal trail system	Yes	RC	N/A
Conservation Commission	Rocky Mountain Conservation Land	30.00	R03-2A-0	Hiking, Nature Study	Combine with Highland Park, Old Municipal Golf Course, Rocky Mountain Park; Formal trail system	Yes	RC	N/A
Conservation Commission	Green River Conservation Land	11.10	R27-16A-0	Hiking, Nature Study	Integrate w/ Murphy Park, swimming area; Formal trail system; Part of "greenbelt"	Yes	RB	N/A
Conservation Commission	Nims Farm Land	23.31	R27-16B-0	Abuts the Green River Conservation Land	Hiking, Nature Study	Limited	RC	N/A
Conservation Commission	Canada Hill/Renfrew Property	16.03	R04-30-0	Hiking, Mountain Biking, Nature Study/Observation	Formal trail system	Yes	RC	DCR Greenways
Conservation Commission	Lovejoy Land	2.49	R27-25A-0	Hiking, Nature Study	Formal trail system	Yes	RB	N/A
Conservation Commission	Lillian Street Conservation Area	25.33	R14-20-0	Hiking, Mountain Biking, Nature Study	Formal trail system	Yes	PI	N/A

Property Owner/Manager	Site Name	Acres	Map-Lot	Current Use/Conditions	Recreation Potential	Public Access	Zoningklklklklkl	Type of Grant Received (if any)
Conservation Commission	Leyden Woods/ Green River Conservation Land	39.00	R28-30-0	Hiking, Mountain Biking, Nature Study	Park/play area; Swimming area; Formal trail system; Part of "greenbelt"	Yes	RB	N/A
Conservation Commission	Bernardston Rd. Conservation Land	12.40	R13-18A-0	Hiking, Nature Study/Observation	Formal trail system	Yes	RC	N/A
Conservation Commission	GTD Conservation Land	122.87	R10-16-0	Hiking, X-County Skiing, Nature Study, Wildlife & Forest Management	More extensive trail system; Trail system linked to Griswold Wildlife Sanctuary	Yes	RC	Stewardship
Conservation Commission	Griswold Wildlife Sanctuary	71.80	R08-12C-0	Hiking, Nature Study, Wildlife & Forest Management	Interpretive trail system; Purchase adjacent lands	Yes	RC	N/A
Conservation Commission	Miller's Meadow (Formerly Wedgewood Gardens)	14.80	48-24-0	Open Space	Bike way connection; possible canoe access; possible location for pollinator gardens and Community Gardens; Possible Pump Track	Yes	RA	FEMA, MEMA, FMA
City of Greenfield	Temple Woods	53.93	R01-10-0	Hiking, Nature Study	Interpretive trail system	Yes	RA	N/A
City of Greenfield	Rocky Mountain Park	117.10	R02-4, R02-6, R02-8, R03-1-0 R03-2A-0	Hiking, Biking, Photography, Nature Study/Observation	Combine w/Highland Park, Old Municipal Golf Course; Formal trail system	Yes	RC	N/A

Property Owner/Manager	Site Name	Acres	Map-Lot	Current Use/Conditions	Recreation Potential	Public Access	Zoningklklklklkl	Type of Grant Received (if any)
City of Greenfield	Mohawk Trail – City Property	48.32	R25-35A-0	N/A	Combine w/Shelburne Rd. Conservation Land; Formal trail system	Limited	GC	N/A
City of Greenfield	Westwood Wildlife Sanctuary	15.70	R14-50-0	Hiking, Nature Study, Jogging, Habitat Preservation, Wildlife Sanctuary, Trail Maintenance	Formal trail system; Purchase adjacent diverse lands	Yes	RB	N/A
City of Greenfield	City Common	.23	51-73-0	Public Gatherings, Festival's, Farmers Market	Extend green area; Improve memorials	Yes	CC	N/A
Recreation Department	Highland Park	29.14	R01-15-0	Walking areas and trails; Pond; Tennis Courts	Combine w/Rocky Mountain & Old Municipal Golf; Upgrade/improve playground; Pond improvements; Update trail maps; Trail maintenance	Yes	RA	N/A
Recreation Department	North Greenfield Park/Community Club	3.40	R11-70A-0, R11-60A-0	Softball field, Open Grassy Area	Overall park improvements; Field expansion and connection to other open spaces	Yes	RB	N/A
Recreation Department	Green River Swimming & Recreation Area	20.13	R27-18-0, R27-19-0, R27-20-0, R27-21	Swimming, Basketball, Picnic Tables, Playground equipment, Pavilion, open grassy areas, walking	Improve erosion on the west side of the River	Yes	RB	LWCF, Urban Self Help Grant

Property Owner/Manager	Site Name	Acres	Map-Lot	Current Use/Conditions	Recreation Potential	Public Access	Zoningklklklklkl	Type of Grant Received (if any)
Recreation Department	Beacon Park	7.20	79-6-0	Community Events, Baseball and Multi-Purpose Fields, Sliding Hill, Tennis Courts/Practice Wall, Playground	Add shade trees, Install picnic tables, Install adult fitness equipment, Install Bocce Court	Yes	RA	N/A
Recreation Department	Green River Park	17.07	R42-1-0, 17-27-0	Playground, Pavilion, Picnic tables, Softball, Basketball, Hiking, Open grassy fields, Nature study/observatory, Dog parks, Pickleball	Formal trail system, Canoe/boat launch	Yes	RA	Small Cities & FCAC Family Network, PARC Grant, Stanton Foundation
Greenfield DPW	Green River Pumping Station/Covered Bridge	13.57	R31-10-0	Water Supply	Hiking; Nature Study/Observation, Part of "greenbelt"	No	RC	N/A
Greenfield DPW	Leary Well Site	13.32	R30-14A-0	Water Supply	None	No	RC	N/A
Greenfield DPW	Millbrook Wellfields	23.29	R11-84-0	Water Supply	None	No	RB	DEP-ALA
Greenfield DPW	Eunice Williams Road	2.77	R31-13-0, R31-12-0, R31-11-0	Fire District Property	None	No	RC	N/A
Massachusetts Division of Capital Planning/Mass DCR	Kells Farm	119.02	R01-7-0, R01-9-0	Agriculture	Formal trail system, Fishing, Canoe/boat launch	Yes	RC	ISTEA

Property Owner/Manager	Site Name	Acres	Map-Lot	Current Use/Conditions	Recreation Potential	Public Access	Zoningklklklklkl	Type of Grant Received (if any)
Mass DCR	Smead Island	3.09	R01-8-0	Part of the CT River Greenway	None	Yes	RC	N/A
Department of Fish and Game	Green River Road	39.29	R32-6-0	Forest	Low	No	RC	N/A
Mass DCR	Eliza Lane/Loomis Road	.49	R04-11-0	Forest	Low	No	RC	N/A
Mass DCR	Turners Falls Road	5.69	R04-12-0	Forest	Low	No	RC	N/A
U.S. Fish and Wildlife Service	French King Highway	20.81	R05-6A-0	Forest	Low	No	GI	N/A

The City of Greenfield owns approximately 232 acres of open space (Table 5-7). All of these parcels are under the authority of the Mayor and are therefore considered to have limited protection from development. If the land were to be held by the Conservation Commission, it would take a majority vote by the Massachusetts State Legislature to convert this open space to another non-conservation use. It is not unusual for a community to set aside land for future expansion of schools, sports fields, police and fire stations, and drinking water supplies. Open space planned for these purposes might be used as open space today and placed under the authority of the Mayor. It may also be sensible to consider placing city owned land that clearly contains wetlands or wildlife habitat under the authority and protection of the Conservation Commission.

It should also be noted that the City of Greenfield owns approximately 150 acres of vacant lots in addition to the properties listed in Table 5-7. The majority of the vacant lots are small-forested parcels. The City could consider investigating which parcels are of high conservation value and focus on permanently protecting them from development. Additionally, the City is interested in building more pocket parks to increase access for all residents to recreational opportunities. Vacant lots best suited for small neighborhood parks should also be identified.

Table 5-7: City-Owned Parcels of Land with Limited Protection from Development

Property Owner/Manager	Location	Acres	Map-Lot	Current Use	Future Improvements	Condition	Public Access	Zoning	Type of Grant Received (if any)
Recreation Department	Abercrombie Field	7.16	4-6A-0	Baseball Field, Batting Cage, Concession Stand	Stabilize and maintain steep slopes, install picnic tables, bleachers and water stations, ADA Improvements	Fair	Yes	RA	N/A
Recreation Department	Energy Park	1.25	29-37-0, 29-35D-0, 29-35E-0, 29-35F-0	Educational displays; Gardens; Play Structures, Caboose Museum, Performance Stage	None planned	Good	Yes	CC	ISTEA
Recreation Department	Hillside Park	4.90	70-26-0	Playground, Picnic Tables, Basketball, Softball, Splash Pad	Add restrooms, Install shade structure for the Splash Pad, Construct Walking Path, Install Pavilion	Good	Yes	RA	Our Common Backyard, CDBG
Recreation Department	Lunt Fields	6.62	95-1C-0	Baseball Fields	ADA improvements to field house and bathrooms	Good	Yes	GI	CDBG
Recreation Department	Davis Street Courts	3.40	103-23-0	Tennis	None Planned	Good	Yes	RA	N/A
Recreation Department	Shattuck Park	6.90	104-55-0	Walking, Playground	Fitness Equipment	Good	Yes	RA	N/A
Recreation Department	Murphy Park	31.00	R27-24B-0	Softball Fields, Hiking, Nature Study, Picnic Tables	Integrate with Green River Cons. Land, swimming area, ADA Improvements	Fair	Yes	RB	N/A
Recreation Department	Veteran's Memorial Field	7.00	110-14-0	Playing Fields-Football, Softball,	Field Lighting, ADA Improvements	Good	Yes	RA	N/A

Property Owner/Manager	Location	Acres	Map-Lot	Current Use	Future Improvements	Condition	Public Access	Zoning	Type of Grant Received (if any)
				Baseball, Batting Cages					
Greenfield Housing Authority	Oak Courts Playground	.23	98-51-0	Playground/Climbing Structure, Picnic Tables, Basketball Court, Baseball Field, Roller Ramp	None Planned	Good	Yes	RA	Small Cities & FCAC Family Network
Department of Public Works	River Works Park/Brookie Park	.59	19-44-0, 19-45-0, 19-43-0	Public Art, Garden, Sitting area	None currently – new facility	Good	Yes	GC/RA	N/A
Recreation Department	Old Municipal Golf Course	54.52	R01-12-0	Hiking, X-county Skiing, Nature Study/observation	Combine w/Highland Park & Rocky Mountain; Picnic sites	Good	Yes	RA	N/A
City of Greenfield	Veteran's Mall	.23	51-77-0	Memorial Services, Sitting Area	Increase security, improve maintenance	Good	Yes	CC	N/A
Recreation Department/City of Greenfield	Academy of Early Learning	2.75	101-49-0, 101-30-0	Playgrounds, Grassy Fields	Playground was recently upgraded	Good	Limited	RA	Kaboom Construction Grant
Recreation Department/City of Greenfield	Federal Street School	3.63	67-28-0, 67-29-0	Playground, Open Blacktop Play Area, Basketball Court	Playground was recently upgraded	Good	Limited	LC/SR	Kaboom Let's Play Grant
Recreation Department/City of Greenfield	Four Corners Elementary School	10.01	122-7-0	Playground, Open Grassy Fields, Softball Field, Blacktop Play Area, Basketball Court,	Playground was recently upgraded. Repave Basketball Court	Good	Limited	RA/LC	N/A

Property Owner/Manager	Location	Acres	Map-Lot	Current Use	Future Improvements	Condition	Public Access	Zoning	Type of Grant Received (if any)
				Nature Study					
Recreation Department/City of Greenfield	Greenfield Middle School	6.99	80-1-0	Softball Field, Open Playing Fields, Playground	Playground was recently upgraded	Good	Limited	RA/LC	N/A
Recreation Department/City of Greenfield	Green River School	2.82	20-17-0	Play Equipment, Open Grassy Field	Upgrade/improve playground	Fair	Limited	RA	N/A
Recreation Department/City of Greenfield	Newton Elementary School	6.59	47-2-0	Playground Open Grassy Field, Open Blacktop Area, Basketball Court	Replace old swing structure	Good	Limited	GC	Kaboom Let's Play Grant
City of Greenfield	Washington Street School	.47	19-38-0	Playground/Climbing Structure, Open Grassy Area	Upgrade/improve playground	Fair	Limited	GC	N/A
City of Greenfield	Greenfield High School	21.70	109-1-0,	Playing Fields-Softball, Field Hockey, Soccer, Track	General field maintenance, ADA Improvements, Field Lighting	Good	Limited	RA	N/A
Greenfield Recreation/ City of Greenfield	Greenfield Teen Center	.26	77-19-0	Indoor Teen Recreational Activities	Exterior building repairs	Good	Yes	RA/RC	N/A
City of Greenfield	Water Pollution Control Plant	5.3	14-1A-0, 14-3A-0, 15-1-0	Treatment Plant	Public educational display re: ecology & sewage treatment	Good	No	RC	DEP 0% Loan

Property Owner/Manager	Location	Acres	Map-Lot	Current Use	Future Improvements	Condition	Public Access	Zoning	Type of Grant Received (if any)
City of Greenfield	Police Station	4.81	R03-9-0	Police Station	None	Good	Limited	GC	N/A
City of Greenfield	Animal Shelter	4.12	R04-35-0	None	None	Fair	No	GC	N/A
City of Greenfield	Federal Street Cemetery	4.0	77-24-0	Cemetery	Walking, Birdwatching	Good	Yes	LC	N/A
City of Greenfield	DPW Lot	3.0	74-74-0	DPW Garage	None	Good	Limited	GI	N/A
City of Greenfield	John Zon Community Center	2.02	68-1-0	City's Senior Center and public gathering space	Plant shade trees	Good	Yes	RA	N/A
City of Greenfield	Public Library	1.93	56-2-0	Municipal	None planned – City will be building a new library	Good	Yes	CC	N/A
City of Greenfield	City Hall	.69	51-71-0	Municipal	None planned – municipal facility	Good	Yes	CC	N/A
Greenfield DPW	Landfill	8.5	R42-17A-0	Transfer Station, Recycling Facility	None	Good	Yes	GC	N/A
City of Greenfield	Riverside Community Bike Path	N/A	N/A	Bike Path	None planned	Good	Yes	N/A	ISTEA
City of Greenfield	Parking Garage	.39	51-16-0	Pocket park	None planned	Good	Yes	CC	N/A

D. Recreational Resources and Open Space Equity

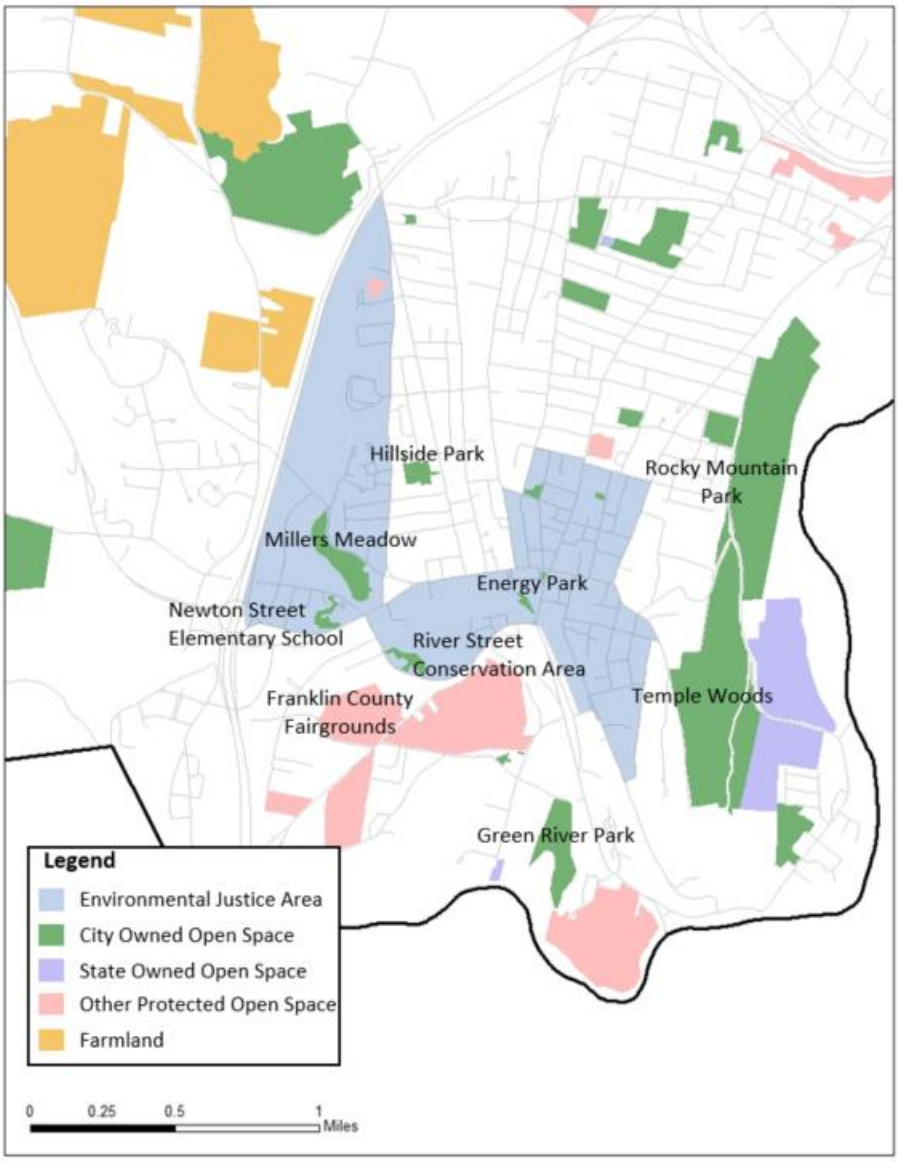
Ensuring park and open space equity requires assessing conservation and recreation opportunities available in the City and determining if there are areas of the City that seem to be lacking resources. Sections of Greenfield qualify as Environmental Justice Population areas, where median household incomes are below 50% of the state median household income according to the 2010 U.S. Census (see the Environmental Justice Area map). Moreover, Greenfield as a whole has a lower median household income and a higher poverty rate than Franklin County and the State. Residents may be unable to afford recreational opportunities that require a fee, such as the public swimming area on the Green River, or may lack transportation to open space and recreation resources in other areas of the City. It is therefore important to ensure free or affordable access to an adequate amount of well-maintained open space and recreational resources within walking distance of EJ areas and downtown, and to provide free or affordable recreational programming for residents.

The Trust for Public Land (TPL), a conservation organization that works with communities across the country to develop parks and outdoor recreation opportunities, has established a half mile, or 10 minute, walk from home to a park or publicly accessible open space as a common national standard for communities to strive for.[50] In more developed areas, this could mean a park, playground, or bike path within a ten-minute walk (approximately ½ a mile) from all homes. However, a community could still strive for residents to have access to a village park, for instance, or a trailhead within a ten-minute walk from their homes.

When applying this standard to Greenfield, the downtown area, where a large number of residents live, has good access to parks within walking distance from homes. An analysis conducted using GIS data found that all of the EJ area in Greenfield is within a half-mile of a park or open space; the EJ areas and some of the popular nearby parks are highlighted in Figure 5-1 below. However, as discussed throughout this plan, the FRTA bus routes do not run between the downtown area and any of the City parks. Therefore, off-road trails, sidewalks, and on-road bicycle improvements could all be explored as options to improve access between recreation opportunities and neighborhoods. The Open Space Committee is interested in improving public transportation and access to recreational opportunities such as hiking trails throughout the City.

[50] http://www.tpl.org/our-work/parks-for-people.

Figure 5-1: Park and Open Space Equity Map



E. OPPORTUNITIES FOR FUNDING OPEN SPACE AND CONSERVATION PROJECTS IN GREENFIELD

The opportunities for the City of Greenfield to procure funding for open space projects can be a challenge, as limited financial resources are available for funding open space projects. The following paragraphs provide a brief description of some of available resources for funding open space and conservation projects, with applicant type noted below the grant name. Many of these grants are offered by the Department of Conservation Services and Cities and municipalities are eligible for the funding with an approved and updated 7-year Open Space and Recreation Plan.

E.1 REGIONAL AND STATEWIDE CONSERVATION ORGANIZATIONS

Local and statewide conservation organizations exist to conserve and steward land in partnership with municipalities and landowners. In addition to providing various paths toward protecting land from development, they are also experienced partners in many of the following funding opportunities.

The Franklin Land Trust (FLT) works with farmers and other landowners to protect their land from unwanted development. The organization works to conserve farms, forests, wildlands, and other natural resources through the values of regional sustainability (through local economy and balanced community growth, land stewardship, community involvement, and support for the goals of landowners. FLT serves landowners in towns in western Franklin and Hampshire counties, protecting land by holding CRs and APRs on private property and purchasing property in fee.

Mount Grace Land Conservation Trust works with private landowners to protect their land in many creative ways: with working forest and forever wild conservation restrictions, by taking ownership and managing land as multi-use resources or natural area reserves, and by providing services and locating funding sources to enable transfers of land to public ownership. MGLCT's Landscape Conservation Program uses funding sources like the United States Forest Service Forest Legacy Program and the United States Fish and Wildlife Service North American Wetlands Conservation Act, and the Massachusetts Energy and Environmental Affairs Landscape Partnership Grants because they are structured to complement a multi-landowner approach to conservation. Mount Grace also uses a variety of tools to support farm conservation, especially the Agricultural Preservation Restriction (APR) program.

The Community Conservation Program at MGLCT helps municipalities identify their top land protection priorities and reach out to diverse groups of stakeholders in order to protect scenic resources and community character. The program outlines possible conservation strategies so municipalities can make informed decisions.[51] Although Mount Grace Land Conservation Trust (MGLCT) stands ready to help the City of Greenfield, it does not have funds of its own available to donate to the City for protecting open space. MGLCT, like other land trusts, must be creative in searching for funding for projects. MGLCT can be most helpful by serving Greenfield on a consultant basis and by recommending funding sources for which the City can apply on its own. Also, when it is necessary, MGLCT can further assist the City by pre-acquiring an open space parcel and holding it on behalf of the City to allow time for Greenfield to take out a loan and apply for grants to pay for it.

[51] Mount Grace Land Conservation Trust website: https://www.mountgrace.org/programs. Accessed May 7, 2019.

E.2 GRANT OPPORTUNITIES

Local Acquisitions for natural Diversity (LAND) Grant Program
(formerly the Self-Help grant program)
Municipal conservation and agricultural commissions
The Commonwealth of Massachusetts offers a grant program through the Executive Office of Energy and Environmental Affairs, Division of Conservation Services, to assist municipalities with open space projects. This program was formerly known as the "Self Help" grant program and is now entitled the LAND grant program (Local Acquisitions for Natural Diversity). Conservation or Agricultural Commissions from communities with an up-to-date Open Space and Recreation Plan are eligible to apply for reimbursement grants to acquire land for conservation and passive recreation in fee or for a conservation restriction. The grant supports the purchase of forests, fields, wetlands, wildlife habitat, unique natural, cultural, or historic resources, and some farmland. The public must have reasonable access to the land. Reimbursement rates are between 52-70%, with a maximum grant award of $400,000.
https://www.mass.gov/service-details/local-acquisitions-for-natural-diversity-land-grant-program

PARC Grant Program
Municipalities
The Parkland Acquisitions and Renovations for Communities (PARC) Grant Program, offered by the Executive Office of Energy and Environmental Affairs, Division of Conservation Services, was established to assist cities and towns in acquiring and developing land for park and outdoor recreation purposes. These grants can be used by municipalities to acquire parkland, build a new park, or to renovate an existing park. Applications are open to all municipalities that have submitted an up-to-date Open Space and Recreation Plan, however, the number of residents in a town may affect the grant amount. Reimbursement rates are between 52-70%, with a maximum grant award of $400,000.
https://www.mass.gov/service-details/parkland-acquisitions-and-renovations-for-communities-parc-grant-program

Massachusetts Land and Water Conservation Fund Grant Program
Municipalities
The Massachusetts Land and Water Conservation Fund Grant Program is offered through the Executive Office of Energy and Environmental Affairs, Division of Conservation Services, and is funded from the Federal Land and Water Conservation Fund. The program provides up to 50% reimbursement for the acquisition of parkland or conservation land, creation of new parks, renovations to existing parks, and development of trails. Municipalities with up-to-date Open Space and Recreation Plans are eligible to apply.
https://www.mass.gov/service-details/massachusetts-land-and-water-conservation-fund-grant-program

Conservation Partnership Grant Program

Non-profits

This is a State grant program that is designed to help land trusts and other non-profit conservation organizations acquire interests in land for conservation or recreation purposes. Potential projects fall into one of two categories: acquisition of the fee interest in land or a conservation restriction; or due diligence for land or a conservation restriction that was donated to the organization. The maximum reimbursement amount available for a single project is 50% of the total eligible project cost up to the grant award maximum of $85,000.
https://www.mass.gov/service-details/conservation-partnership-grant-program

Landscape Partnership Grant Program

Federal, state, local governments and non-profits

This State grant program provides funding for large-scale (minimum of 500 acres), joint conservation projects completed in partnership with federal, state, and local governments, and non-profits. The grant is a reimbursement for up to 50% of the project cost with a maximum grant award of $1,250,000. Eligible projects include: purchase of land in fee simple for conservation, forestry, agriculture, or water supply purposes; purchase of a Conservation Restriction, Agricultural Preservation Restriction, or Watershed Preservation Restriction; and construction of a park or playground in communities with less than 6,000 residents. Applications must be submitted jointly by two or more applicants including municipalities, non-profits, and State agencies.
https://www.mass.gov/service-details/landscape-partnership-grant-program

Agricultural Lands Conservation Program / Wetlands Reserve Easements

Landowners

This is a federal funding program through the United States Department of Agriculture's (USDA) Natural Resource Conservation Service (NRCS). The program provides financial and technical assistance to help conserve agricultural lands and wetlands. Under the Agricultural Land Easements component of the program, NRCS helps state and local governments and conservation organizations protect working agricultural lands and limit non-agricultural uses of the land. NRCS provides up to 50% of the fair market value of the agricultural land restriction. Under the Wetlands Reserve Easements component of the program, NRCS helps to restore, protect and enhance wetlands. Depending on the length of the restriction, NRCS may pay up to 100% of the cost of the restriction as well as wetland restoration costs.
https://www.nrcs.usda.gov/wps/portal/nrcs/detail/ma/home/?cid=nrcs143_008419

MDAR Stewardship Assistance and Restoration on APRs

APR landowners

This grant is intended to help APR landowners restore APR land that was once in agricultural production to be put back into production. In addition, funds may be used to restore farm

resources that have been negatively impacted by flooding, erosion, storms, tornadoes and other natural disasters or for restoration on land impacted by a third party.
https://www.mass.gov/service-details/stewardship-assistance-and-restoration-on-aprs-sara

Recreational Trails Program

Municipalities, non-profits, and landowners

This grant is a federal assistance program of the United States Department of Transportation's Federal Highway Administration (FHWA), administered at the State level through MassTrails, part of the DCR. It provides funding for the development and maintenance of both motorized and non-motorized recreational trail projects.
https://www.mass.gov/guides/recreational-trails-program

Community Forest and Open Space Conservation Program

Municipalities, non-profits, federally recognized Indian tribes

This grant provides funds to establish community forests through fee simple acquisition of private forest land from a willing seller. The program aims to establish community forests by protecting forest land from conversion to non-forest uses and providing community benefits.
https://www.mass.gov/guides/community-forest-grant-program

Partners for Fish and Wildlife

Municipalities, non-profits, landowners, and tribal organizations

This grant program supports fish and wildlife conservation projects on private lands. Eligible projects include restoring trust with local communities, modernizing fish and wildlife infrastructure, conservation projects near National Wildlife Refuge lands, expansion of priority habitats and wildlife corridors, and regional strategic conservation plans. Awards of up to $750,000 are available. Consult with your Regional Partners for Fish and Wildlife Program office before submitting an application.
https://www.fws.gov/partners/

Clif Bar Family Foundation Small Grants Program

Non-profits and other small- or medium-sized organizations

The Foundation supports innovative small and mid-sized groups working to protect the Earth's beauty and bounty, create a healthy food system, increase opportunities for outdoor activity, reduce environmental health hazards, and build stronger communities.
http://clifbarfamilyfoundation.org/Grants-Programs/Small-Grants

MassWildlife Habitat Management Grant Program

Municipalities and landowners

This provides funds to owners of conserved lands to enhance wildlife habitat, while promoting public access for outdoor recreation. The grant encourages landowners to engage in active habitat management on their properties to benefit many types of wildlife, including species of

greatest conservation need and game species. Over the past 5 years, the MHMGP has awarded over $1.9M in funding for 74 habitat projects.
https://www.mass.gov/guides/masswildlife-habitat-management-grant-program-mhmgp

Municipal Vulernability Preparedness Action Grants

Municipalities

This grant offers financial resources to municipalities that are seeking to advance priority climate adaptation actions to address climate change impacts resulting from extreme weather, sea level rise, inland and coastal flooding, severe heat, and other climate impacts. Municipalities who have received designation as a Climate Change Municipal Vulnerability Preparedness (MVP) Community map apply. All projects are required to provide monthly updates, project deliverables, a final project report, and a brief project summary communicating lessons learned. The municipality is also required to match 25% of total project cost using cash or in-kind contributions. Greenfield will complete the MVP planning process in 2021.
https://www.mass.gov/service-details/mvp-action-grant

Community Preservation Act

Muncipalities and Non-profits

The Community Preservation Act is legislation that allows cities and towns to raise funds for use in local open space, historic preservation, community housing, and outdoor recreation projects. The Community Preservation Act (CPA) provides new funding sources which can be used to address three core community concerns:

- Acquisition and preservation of open space
- Creation and support of affordable housing
- Acquisition and preservation of historic buildings and landscapes

The CPA allows communities to create a local Community Preservation Fund to raise money through a surcharge of up to 3% of the real estate tax levy on real property for open space protection, historic preservation and the provision of affordable housing. The act also creates a state matching fund, which serves as an incentive to communities to pass the CPA. Municipalities must adopt the Act by ballot referendum. Communities can choose to exempt the first $100,000 of taxable residential real estate value, as well as low-income households, from the surcharge. Greenfield adopted the CPA at a 1% surcharge in 2020.

A minimum of 10% of the annual revenues of the fund must be used for each of the three core community concerns, and up to 5% may be used for administrative expenses of the Community Preservation Committee. The remaining funds can be allocated for any combination of the allowed uses, or for land for recreational use. This gives each community the opportunity to determine its priorities, plan for its future, and have the funds to make those plans happen. If residents don't feel the CPA is working as they expected, they can repeal it or change the surcharge amount.
https://www.communitypreservation.org/about

SECTION 6

Community Vision

A. DESCRIPTION OF PROCESS

The City of Greenfield's open space and recreation goals from the 2012 Open Space and Recreation Plan were reviewed by the members of the Open Space Committee and were reaffirmed through a thoughtful and comprehensive public outreach and planning process that included the following:

- In November 2020 an Open Space and Recreation Survey developed by the Greenfield Open Space Planning Committee was widely circulated online via social media, the City's website, an article in the *Greenfield Recorder,* and through the Franklin County Resource Network, which connects to over 60 social and human service agencies. Additional copies of the survey were made available at the Library and at City Hall. The Committee received 272 responses to the survey.
- From February 2020 to March 2021, the Greenfield Department of Planning and Development, the Open Space Planning Committee and the Franklin Regional Council of Governments Planning Department developed and updated the Open Space and Recreation Plan using several methods for involving public participation:
    - The Open Space and Recreation Survey results were used to support the development of Section 8 Goals and Objectives as well as the overall open space and recreation goals and vision.
    - Eight public meetings were held by the Open Space Planning Committee and were open to the public.
    - Drafts of plan sections were sent to the Open Space Planning Committee members representing City boards and community groups.
    - A public forum will be held on April 21, 2021, where residents will review and discuss the inventory, analysis, community goals, objectives, and seven-year action plan. All public comments will be recorded and incorporated into the plan.

B. STATEMENT OF OPEN SPACE AND RECREATIONAL GOALS

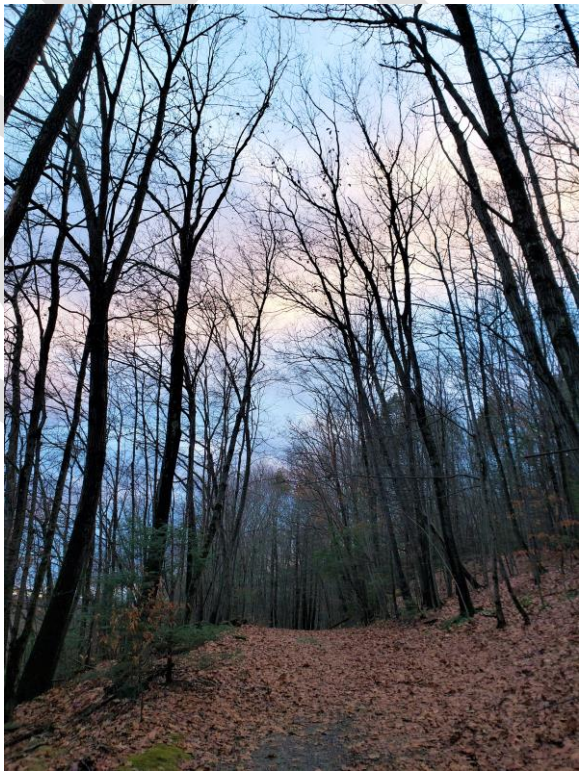
Greenfield is comprised of a variety of natural features and environments including major rivers, streams, brooks, forests, farms, scenic vistas, historic sites, and urban and rural areas. Residents believe it is important that these features, which make Greenfield a distinct and desirable place in which to live, be protected.

Open space is important for the health and wellbeing of Greenfield residents. Open space also provides services that play a critical role in rebalancing our climate and creating habitat essential to the life on our planet – so that the plants, pollinators and other wildlife can thrive.

According to the 2020 Open Space and Recreation Survey and the Open Space and Recreation Committee, the overarching vision for the future of open space and recreation in Greenfield is to:

- Increase the City's resilience to climate change through thoughtful conservation and stewardship of open spaces, woodlands, farms, and river corridors
- Improve physical access to, and quality of, the City's current open space and recreation amenities;
- Expand opportunities for all residents to engage in programmed and passive recreation activities;
- Enhance urban spaces by increasing the City's tree canopy, pollinator gardens, community gardens, and small parks.

As discussed throughout this plan, the effects of climate change will inform open space and recreation decisions in the City. To help create this vision, the City will increase its science based education and outreach efforts to better inform residents the impacts of climate change, as well as apply the latest Massachusetts guidelines on climate change resiliency planning, including priorities from the 2021 Greenfield Municipal Vulnerability Preparedness Plan and 2014 Sustainable Master Plan. These achievements will enhance biodiversity, create more resilient land use and development, and improve both public and private open spaces for the enjoyment of people locally and regionally.



A view of Temple Woods. *Photo credit: Mary Chicoine*

Recreation pastimes will include both active and passive activities such as hiking, walking, bicycling, nature/birdwatching, and boating. These pastimes are and will continue to be made available by the conserved areas and parks throughout the City, extensive trail systems, safe roads for pedestrians and bicyclists, and other recreational amenities.

SECTION 7

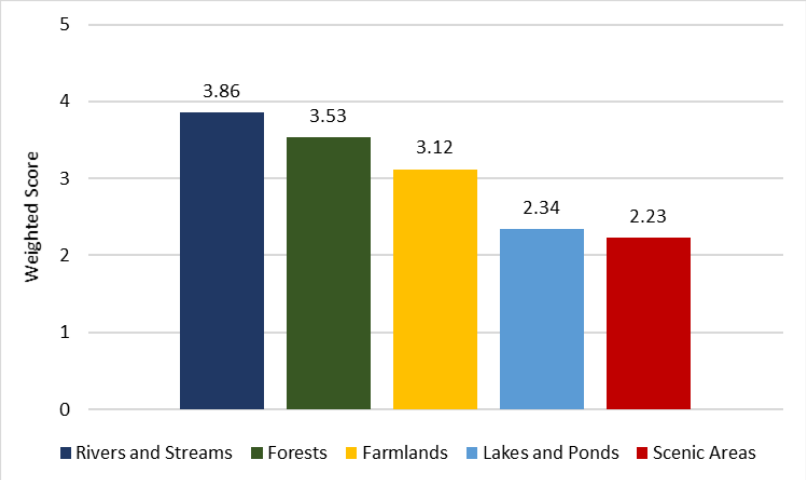
Analysis of Needs

The Greenfield Open Space and Recreation Plan incorporates the inventory of all the land-based natural, scenic, and cultural resources that are available in the City (Section 4), identifies the most important parcels of land that contain these resources (Section 5), and based on the community's general goals (Section 6), makes comparisons between the supply of resources and the demand (Section 7). In the following section, the recreation and open space needs of residents are identified using the 2020 Open Space and Recreation Survey, data from Sections 3, 4, and 5, and Committee input. Finally, the obstacles to the effective resolution of these needs are addressed including organizational barriers and the most significant land use conflicts concerning open space and natural resource use.

A. SUMMARY OF NATURAL RESOURCE PROTECTION NEEDS

Greenfield residents value natural resources and open spaces that all contribute to the City's distinct character and diverse scenery. According to the 2020 Open Space Survey, respondents consider the City's rivers, streams, and forests to be Greenfield's top open space assets (Figure 7-1).

Figure 7-1: Greenfield's Most Important Open Space Assets[52]



Fortunately, promoting the health of the City's waterways and forests are compatible priorities. The protection of contiguous forestland and land along rivers and streams has the added benefit of also protecting the City's drinking water supply and wildlife habitat.

Protecting land along rivers and streams provides multiple benefits. Riparian buffer areas help protect water quality by filtering and slowing stormwater runoff from adjacent land uses and

[52] Survey respondents were asked to rank the importance of each of these resources on a scale from 1 to 5, where a score of 1 indicated "most valuable" and a sore of 5 indicated "least valuable".

support habitat for species that rely on cool water temperatures. Permanently protected land along rivers can help attenuate flood waters and protect life and property downstream from the impacts of a hurricane or Tropical Storm. Carefully planned riverfront areas can provide public access to the water while minimizing impacts on habitat and water quality. Improving and expanding river access in Greenfield is a priority for the City and was noted by many residents as a point of interest.

Climate change and its impacts on Greenfield's natural resources has been a central focus of this Open Space and Recreation Plan update. Natural resources, including wildlife and habitats, are being impacted from a changing climate in Massachusetts, and will continue to be impacted as temperatures rise and precipitation patterns change over the coming decades. At the same time, these natural resources help mitigate the impacts of climate change, including sequestering and storing carbon and absorbing and reducing floodwaters. While climate change will continue to be a major challenge globally, local efforts and decisions have real and lasting impacts on mitigating and adapting to future climate change. One of the most effective, and least costly, strategies is to steward existing natural areas for increased resilience to climate change.

Results from the 2020 Open Space Survey indicate the City allocating funding or pursing grant funding for the following activities related to natural resource protection is "very important":

- Permanently protecting land within the mapped river corridor of the Green River (77%)
- Permanently protecting Greenfield's working farms from development (74%)
- Permanently protecting forests in Greenfield from development (69%)

One positive development since the writing of the last Open Space and Recreation Plan is a significant increase in the number of permanently and temporarily conserved acres of agricultural land. Acres of permanently conserved land increased by 52%, whereas temporarily conserved farmland through the Chapter 61A program increased by 43%. As reported in Section 5, 15% of Greenfield is conserved farmland. However, as noted throughout this Plan, farmland in the Chapter 61A program is only temporarily protected. There are a multitude of strategies available to preserve the City's farmland and local agricultural industry, including working with farmers to join the APR program and MDAR's Stewardship Assistance and Restoration grant program. Additionally, the City could work to add more community gardens, as stated in the Action Plan.

The challenge for many communities in Franklin County is to grow in population without diminishing natural resources like contiguous forests and clean water beyond the capacity of local ecosystems. Well-planned economic development could help provide jobs and small-scale commercial enterprises that serve the community. Additionally, and carefully sited housing development can better meet the needs of residents in search of suitable dwellings and reduce impacts to the City's natural environment.

To protect large blocks of forest from fragmentation might require both land protection efforts and strategies similar to those that would support agriculture. Land protection work may begin with providing landowners (residents and non-residents) with information about the benefits and risks of enrolling in the Chapter 61 programs, protecting their land with a conservation restriction, and with estate planning in general.

Greenfield Officials may want to focus on continuing the good working relationships with regional land trusts for the purpose of assigning the City's right-of-first refusal in the event that a key Chapter 61 parcel is put up for sale. Often land trusts are able to bring together sources of income and potential buyers of land and development rights in a shorter time frame than if the City were to attempt it on its own. By being prepared, Greenfield may be more likely to see the preservation of choice parcels of forest containing unique habitat, historic resources, scenic views, and trail systems. However, because forestland conserved under Chapter 61 programs must engage in forest management, the Committee discussed advocating with the State for a new category of Chapter 61 program that would provide incentives to landowners who keep their forests intact for the purpose of carbon storage.

The survey also asked community members which improvements they would like to see the City make. Projects that would help to address environmental challenges that were ranked as "very important" by survey takers include:

- Working with willing farmers and other landowners to permanently conserve important farms, woodlands, and natural areas (68%)
- Planting more trees in parks, and along streets and sidewalks (57%)
- Removing invasive plant and tree species from parks and permanently protected land (44%)

The Committee also views these issues as important, and incorporated several projects into the Action Plan to address conserving additional farmland, increasing the City's urban tree canopy, and developing invasive species management plans for areas in need such as the Green River or Temple Woods. Residents in the City of Greenfield who participated in the November 2020 election voted to adopt the Community Preservation Act (CPA) with a 1% property tax surcharge. This new funding source will provide the City with an additional funding opportunity that can be used to take on land conservation projects.

B. SUMMARY OF COMMUNITY'S NEEDS

Planning for a community's open space and recreation needs must work to satisfy the present population's desires for new facilities, spaces, and services and also interpret and act on the available data to prepare for the future needs of Greenfield residents. Although the Greenfield Open Space and Recreation Plan will be updated in seven years, the types of actions that are identified in Section 9 take into account the needs of the next generation as well. The outcome

of the survey showed strong public support for maintaining existing parks and playgrounds and preserving waterways and farmland.

The Commonwealth completed The Statewide Comprehensive Outdoor Recreation Plan (SCORP), *Massachusetts Outdoors 2017,* an update of the SCORP 2012 five-year plan. SCORP plans are developed by individual states to be eligible for federal Land and Water Conservation Fund (LWCF) grants and serve as a tool for states to use in planning for future needs and uses of outdoor resources for public recreation and relaxation. As part of the update process to the 2017 SCORP, a survey of Massachusetts residents was conducted to assess their desires and needs for outdoor recreation. The surveys show that the top priority for survey respondents is the desire for more trails of all kinds. Respondents said that they want more City-wide trail systems, hiking trails, and multi-use trails for both walking and bicycling. These priorities reflect the responses from the 2020 Open Space and Recreation Survey distributed to Greenfield's residents.

The 2020 Open Space and Recreation Survey, discussions at Open Space Planning Committee meetings, and research into the ownership, protection status, and use of existing open space parcels in Greenfield helped to identify several community needs relating to open space and recreation resources. The priorities of the SCORP were reflected in responses from the Greenfield Open Space Survey, which specified the need for safety improvements and signage on roads and sidewalks for walking and bicycling, as well as trails for hiking. Respondents identified the need for safer pedestrian access at some locations, especially at Poet's Seat, and increased access to natural areas throughout the City for those without cars or who would like to travel by bike or foot.

The overarching goals as expressed in the survey are: maintenance and improvements at existing recreation facilities and open space; pedestrian, cyclist, and accessibility improvements to roads and sidewalks; expanded trail systems within and across the City; expanded recreational programs for teens; and increased community outreach informing resident of existing recreational resources.

According to the 2020 Open Space Survey the ten (10) most popular recreational activities in Greenfield are:

1. Walking (95%)
2. Hiking (80%)
3. Swimming (54%)
4. Playing at playgrounds (52%)
5. Bird/nature watching (50%)
6. Picnicking (44%)
7. Summer concerts (42%)
8. Walking pets (41%)
9. Sledding/tubing (35%)
10. Canoeing/kayaking (32%)

Action items related to these popular activities include developing a Green River Greenway trail system from the Swimming and Recreation area to the Green River pumping station, installing new signs and trail markers in Highland Park, improving connections from the Rocky Mountain Ridge to other open spaces and hiking trails, and developing the Wedgewood Gardens site to continue to be used as a dog walking area, and adding more plantings to attract pollinators.

Many survey respondents noted that they would like to see the City continue to maintain and improve existing facilities before adding in new ones. However, if new facilities were to be added the following would be favored:

- Hiking trails (46.67%)
- Public restrooms (37.78%)
- Natural Areas (37.78%)
- Skate Parks (33%)
- Public Art (32.96%)

In the "other" category, the greatest calls were for the addition of bike paths, bike trails that are separate from hiking trails, accessible trails, more legal swimming areas, and boat launches.

Top Photo: Park and recreation facility upgrades could include more public art, such as this decorated utility box in Greenfield. *Photo credit: Mary Chicoine.*
Bottom photo: An example of a universal access trail, which is of interest to survey respondents. *Photo credit: Mass DCR.*

The survey also asked respondents to identify whose open space and recreation needs are currently not being met. One hundred people answered this question, and the most frequently mentioned groups were:

- Young people/teens
- People with disabilities
- Those who live in the center of Greenfield/away from green spaces
- People without private transportation

The Action plan also calls for the needs of these groups to be met, by siting and installing a skate park, improving sidewalks and adding universal access trails, improving ADA accessibility at many parks, adding more pocket parks or community gardens in Environmental Justice areas, and increasing biking opportunities throughout the City so residents can depend less on traveling by car. As noted, building a skate park was of interest to about a third of respondents, and many noted that there needs to be more spaces in the City for young people to socialize and recreate. The City of Greenfield is committed to providing the community with a new skate park, as the old one was replaced by an apartment complex. These

actions align well with necessary improvements survey takers indicated are “very important” to the community:

- Providing bike lanes and improving bike facilities (43%)
- Creating new parks in parts of the City that don’t have any (40%)
- Having more events in Greenfield’s parks (36%)
- Creating more spaces for community gardening (34%)

When asked about the overall satisfaction with appearance, maintenance, and cleanliness of the parks, open space, and outdoor recreation sites in Greenfield, 45% answered that they were somewhat satisfied, and 39% answered that they were very satisfied. When asked to describe concerns regarding parks and open space facilities, common answers mentioned trash, dog waste, lack of wayfinding, and safety concerns. The City of Greenfield and Department of Recreation have been working to address many of these concerns since the writing of the last plan, as detailed in Section 9. Municipal officials will continue to address these needs as applicable.

Improved communication and public information about the City’s parks and recreation facilities was another community need identified during the planning process. According to the survey, 63% of residents do not use facilities because they do not know about them. The Committee discussed ways to publicize the City’s parks through online resources and publications, and came up with ways to make parks and trail system more interactive through guided tours and informational signage.

C. MANAGEMENT NEEDS

Greenfield is fortunate to have a great number of organizations interested in the environment in and around the community. There are a number of federal, state, and regional environmental organizations sponsoring land and natural resource protection projects including the Franklin Land Trust, Mount Grace Land Trust, Trout Unlimited, Massachusetts Audubon Society, and Trustees of Reservations. On the community level, groups such as Greening Greenfield, the Greenfield Tree Committee, the Sustainable Greenfield Implementation Committee, and the Nolumbeka Project help the Department of Planning and Development and Recreation Department with maintaining, improving, and planning for the City’s parks and open spaces.

An appointed Open Space Committee could be given the responsibilities to act as the liaison to these organizations reporting to City officials as necessary. Similarly, if City officials are kept abreast of these local and regional efforts, there would be more opportunities for cooperation with adjoining towns. In order for the City to have a permanent Open Space Committee, the group will need to be written into the City’s Charter, which is currently undergoing revisions. There is a great interest for Greenfield to develop a permanent Open Space Committee in order to help implement the actions plan developed during this OSRP update.

Additionally, as the City just adopted the Community Preservation Act, a new Committee will be developed to oversee and plan for how investments from the CPA fund will be used. A permanent Open Space Committee would complement the new CPA committee well, as the groups would be able to collaborate on planning for projects related to land preservation and outdoor recreational facilities.

While the Recreation Department and the Department of Public Works receive funds for general maintenance and management for Recreation sites and the Conservation Commission has funds dedicated to Open Space maintenance, this funding cannot cover all of the community's needs. Unfortunately, parks, playgrounds and open spaces suffer when budgets are tight and maintenance is deferred. There are not enough municipal resources to accomplish the goals and objectives. Therefore, more creative methods to accomplish the goals and objectives will be needed including finding new resources, pursuing partnerships, leveraging other funds, and relying on volunteers. Unless these areas have constant advocacy, they will remain under represented and overlooked in the budget.

Another major obstacle to implementing the recommendations of this Open Space and Recreation Plan will be the effective coordination of all City Departments and Commissions in a manner that promotes communication and discussion of open space and recreation issues between Boards and among the general public. During the update of this OSRP, the City was also working on developing a Municipal Vulnerability Preparedness Plan and a Pollinator Action Plan, and is working on implementing actions from the City's Sustainable Master Plan. An important example of this collaborative work is that the results from all these planning efforts should be reviewed and updated annually by an interdisciplinary committee with input from the public. The Open Space Committee (when permanently established) should actively participate in this process and identify synergies between open space and recreation goals and the development of MVP-funded projects and other grant funded opportunities.

One general open space issue relates to the different ways people believe land should be used and protected. When these different uses are successfully planned, so that the value of each use is represented in the action plan, it is often the result of consensus building among people holding different positions. Gaining consensus among people with strong positions and feelings can take time, resources, and the commitment of each participant in the group. Gaining consensus requires good leadership that understands that tradeoffs on both sides are required to resolve conflict. In open space planning, determining the most important areas to protect is an important step in determining locations to send growth. A balanced and sustainable land use plan will encourage both economic and residential development where appropriate and open space protection where needed.

SECTION 8

GOALS AND OBJECTIVES

The following goals and objectives were formulated from the results of the 2020 Greenfield Open Space and Recreation Planning Survey and meetings of the Open Space Planning Committee. Many of these goals and objectives will be pursued and implemented within the context of increasing and strengthening Greenfield's resiliency to climate change.

A. Preserve, protect, and enhance Greenfield's open spaces

1. Enhance, maintain, and expand recreation facilities, urban green spaces, and open spaces
2. Protect, preserve, and enhance, conservation areas
3. Protect, and preserve agricultural lands, and support farmers and owners of agricultural lands
4. Protect the environment from the negative impacts of human development; encourage low impact development whenever possible
5. Preserve and protect heritage landscapes such as historic, archeological sites, and scenic resources
6. Protect existing trees and plant additional trees along urban streets and on public lands, emphasizing native trees
7. Provide education via public spaces to increase support for the natural environment
8. Anticipate the continuing impacts of climate change on the urban forest
9. Promote the protection of existing trees and planting of additional trees on private lands, and increase knowledge about and enthusiasm for trees

B. Increase municipal & public awareness, understanding, and enjoyment of Greenfield's open space and recreational facilities and programs

1. Improve and increase access for Greenfield residents to public open space and recreational facilities, and improve awareness of the facilities
2. Provide and improve connections to open spaces and decrease the dependency on cars for access
3. Maximize accessibility to all open space and recreation facilities for current and future generations
4. Establish a permanent Open Space and Recreation Committee to serve as a liaison to the Mayor's Office

C. Prioritize climate resiliency in open space and recreational strategies to support the health of the City's people, natural resources, and infrastructure

1. Provide information to the public about how climate change continues to affect Greenfield's open spaces and recreational areas
2. Use both public and private funding to protect, preserve and enhance open space
3. Consider ecological resilience and climate resilience when developing open space protection strategies
4. Combat climate change by increasing the long-term carbon storage of City-owned conservation areas and urban forests by maintaining or increasing forest cover

D. Develop, improve, and promote open space connections

1. Re-establish wildlife migration corridors
2. Promote the creation of pollinator corridors
3. Promote the creation of "green space" along public ways

SECTION 9

SEVEN YEAR ACTION PLAN

The Seven-Year Action Plan fulfills the Open Space and Recreation Plan objectives. The objectives address open space, natural resources, recreation, and community development needs because the quantity and quality of accessible open space relates directly to the state of Greenfield's environment; the City's recreational opportunities; and the quality of future development in Greenfield.

The objectives are listed in the far left column of Table 9-1 and are followed in the same row by recommended actions, responsible board or group, start date, and potential funding sources. By implementing the recommended actions, each objective will begin to be realized. Implementing the Open Space and Recreation Plan will not only require the participation of the Open Space Committee, but it will also necessarily involve many other City groups, as indicated in the "responsible board or group" column in the action plan.

Many of these actions may be constrained by a lack of volunteer time, in addition to funding limitations. Where money is required, such as to permanently protect open space, it does not have to be provided by the City alone. State and federal governmental agencies, private non-profit conservation agencies, and foundations are potential sources of funding. These sources are more likely to invest in land protection projects that have a broad base of community support.

A successful Open Space and Recreation Program, under the primary stewardship of an Open Space Committee, can achieve all of the action steps listed below over time. However, it will be important to establish priorities for the first seven years. The Open Space Planning Committee has prioritized action steps by the goals and objectives listed in the previous chapter. These action steps are represented graphically (where possible) on the Seven-Year Action Plan Map and are outlined in detail in Table 9-1. Any project the City decides to take on will ensure avenues for public input and comment.

ACCOMPLISHMENTS

While updating the Action Plan, the Committee compiled a list of actions that were completed since the last update. A great deal of effort was put into making upgrades and enhancements to the City's open space and recreation facilities, and is made evident from the following list:

- Installed a batting cage at Abercrombie Field
- Installed new signage, picnic tables, benches, and gaga pit at the Municipal Swimming and Recreation Area
- Installed new playground equipment, fencing, sidewalk, and signs at Beacon Park

- Complete renovation of Green River Park including playground, basketball court, pickle ball court, pavilion shelter, picnic tables, benches, two enclosed community dog park areas, paved parking and improved ADA accessibility
- Installed new playground equipment and improved accessibility at Shattuck Park
- Installed a train play structure, replaced message boards and kiosks, and restored the Caboose Museum at the Energy Park
- Installed a Splash Pad, benches, and water fountain at Hillside Park
- Renovation of Lunt Fields to include bleachers, water fountains, bottle fill stations, Green Monster Mini Fenway field improvements, and ADA accessibility upgrades
- Installed bleachers, batting cage, soccer goals, softball press platform, outfield fencing, and water fountains/bottle fill stations as well as electrical upgrades, extension of irrigation system, grandstand tread repair, and concession roof replacement at Veteran's Memorial Field
- Created River Works Park and Olive Street Parking Garage Pocket Park
- Updated park identification signage at parks throughout the City
- Installed new playgrounds at the Academy of Early Learning, Federal Street School, Newton School, Four Corners School, and Greenfield Middle School
- Installed new water fountains and water bottle fill stations at Davis Street Tennis Courts.
- Installed Public Art across the city including Brookie at River Works Park, the Cyclist on Miles Street, Community Mural on Downtown GCC building, Rainworks Art, 82 painted parking meters, and 15 painted electrical boxes
- The Greenfield Tree Committee hosted five neighborhood tree planting events, for a total of about 125 trees planted
- Conducted the 2020 Greenfield Tree Committee inventory, which inventories 1,200 trees
- The Greenfield Tree Committee published a climate-resilient tree selection webpage for residential sites and updated the City's approved tree list
- Updated the City's zoning bylaws to incorporate requirements for Low Impact Development (LID)


Left: Greenfield community members participate in a tree planting event on Birch Street hosted by the Tree Committee. *Photo credit: Mary Chicoine.* **Right:** An image from the new Hillside Park Splash Pad, which residents enjoy on hot summer days. *Photo credit: Andy Castillo, The Greenfield Recorder.*

Table 9-1: Greenfield 2021 Open Space and Recreation Plan Action Plan

OBJECTIVE	ACTION[53]	RESPONSIBLE BOARD or GROUP	START DATE [54]	POTENTIAL FUNDING SOURCES
Goal A. *PRESERVE, PROTECT, AND ENHANCE GREENFIELD'S OPEN SPACES*				
A.1. Enhance, maintain, and expand recreation facilities, urban green spaces, and open spaces	Make needed improvements to Abercrombie Field • Repair the slope behind the field to correct erosion problems • Install picnic tables, bleachers, and water fountain/ bottle station • Improve ADA Accessibility	Recreation Department & DPW	2023	City Budget, Capital, PARC Grant[55], CDBG[56], MA ADA Improvement Grant Program
	Make needed improvements to the Municipal Swimming and Recreation Area • Install second Pavilion Shelter • Upgrade Bridge • Stabilize erosion of bank on the west side of the river • Plant native trees to increase tree canopy and shade in the area	Recreation Department & DPW, Greenfield Tree Committee	2025	City Budget, Capital, PARC Grant, LWCF[57], MVP[58]

[53] Any action highlighted in light yellow is considered a high priority. The high priority designation was determined through the OSRP Community Survey and during OSRP Planning Committee meetings.

[54] For action items that are considered to be ongoing efforts, the start date is given as 2021-2028. Many of the action items can be worked on simultaneously. Also, the start date for a given action item is not set in stone. The Responsible Board/Group could change the start date for a specific action item, as it deems appropriate, after consultation with the Open Space Committee. The start date is also dependent on available funding.

[55] Parkland Acquisitions and Renovations for Communities Grant

[56] Community Development Block Grant

[57] Land and Water Conservation Fund

[58] Municipal Vulnerability Preparedness Grant

OBJECTIVE	ACTION[53]	RESPONSIBLE BOARD or GROUP	START DATE[54]	POTENTIAL FUNDING SOURCES
	• Develop a Green River Greenway trail system through property acquisitions stretching from the Swimming and Recreation Area north to the Green River Pumping Station • Explore other options for increasing swimming opportunities for residents, such as adding a community pool			
	Make needed improvements to Hillside Park • Install Pavilion Shelter • Install shade structure for splash pad • Construct walking path • Research options for permanent public restroom facility • Plant shade trees along the park perimeter including evergreens for summer shade and screening for neighboring residents.	Recreation Department, DPW, Greenfield Tree Committee	2024	City Budget, Capital, PARC Grant, CDBG, LWCF
	Make needed improvements to Beacon Field • Install picnic tables & benches • Upgrade water fountains/ bottle fill stations • Install an adult fitness circuit • Install Bocce Court Facilities • Improve ADA accessibility • Research options for permanent public restroom facility	Recreation Department, DPW, Greenfield Tree Committee, Tree Warden	2021	City Budget, Capital, PARC Grant, LWCF, MA ADA Improvement Grant Program

OBJECTIVE	ACTION[53]	RESPONSIBLE BOARD or GROUP	START DATE[54]	POTENTIAL FUNDING SOURCES
	• Plant shade trees interspersed with existing mature trees along perimeter and on the south and west side of the playground to provide summer shade. • Determine whether there is room to plant a row of trees to the north and paralleling the tennis courts.			
	Make needed improvements to North Greenfield Park • Make improvements to increase use • Evaluate building structure for health and safety and determine feasibility of use • Investigate land acquisition possibilities to expand North Greenfield Park and increase connections to other open spaces/hiking trails	Recreation Department, Department of Planning and Development, DPW, Inspections and Enforcement Department	2028	City Budget, Capital, PARC Grant, CDBG, LWCF
	Make needed improvements to Highland Park and Temple Woods • Install new signs, kiosks, and trail markers, including markers for the new "Trees of Highland" hike. • Restore Highland Pond for recreational use • Install new playground equipment • Install picnic tables & benches • Maintain trail system • Update trail maps	Recreation Department, Conservation Commission, DPW, Greenfield Tree Committee	2024	City Budget, Capital, Greenfield Tree Committee MassTRAILS Grant, LWCF

OBJECTIVE	ACTION[53]	RESPONSIBLE BOARD or GROUP	START DATE[54]	POTENTIAL FUNDING SOURCES
	• Improve ADA Accessibility • See additional actions under A.2 related to invasive species			
	Make needed improvements to Green River Park • Improve ADA accessibility for softball fields • Replace wooden barriers or install guard rail on Petty Plain Road • Explore trail and river access development options • Research options for permanent public restroom facility	Recreation Department & DPW	2028	City Budget, Capital, MassTRAILS Grant, CDBG, LWCF
	Make needed improvements to Shattuck Park • Install new picnic tables & benches • Install Fitness Cluster • Conduct an inventory of the urban woods • Conduct tree pruning on aging trees in the woods • Interplant young native trees to increase tree diversity in the woods • Design and install interpretive signs that describe the function of the woods and the primary tree species	Recreation Department & DPW, Greenfield Tree Committee, Tree Warden	2022	Capital, City Budget, U.S. Forest Service Tree Grant

OBJECTIVE	ACTION[53]	RESPONSIBLE BOARD or GROUP	START DATE[54]	POTENTIAL FUNDING SOURCES
	Make needed improvements to Poet Seat/Rocky Mountain Ridge • Repair tower stairway • Replace benches • Maintain trail system • Develop a formalized interconnected trail system along the entire length of the Rocky Mountain Ridge • Update trail maps • Repave roadway • Work with Department of Conservation and Recreation on connecting existing trails with the Kells Farm property or creating a river access point for boaters • Investigate opportunities to improve pedestrian safety and pedestrian access to Poet's Seat and Sachem's Head from Maple Street to Rocky Mountain Road, such as conducting a traffic study on Mountain Road, installing a flashing light crosswalk, adding a stop sign, or a "Slow for pedestrians" sign • Add a sign to indicate proper parking • Improve connections to other open spaces/hiking trails	Recreation Department & DPW, FRCOG	2024	Capital, City Budget, MassTRAILS Grant, LWCF

OBJECTIVE	ACTION[53]	RESPONSIBLE BOARD or GROUP	START DATE [54]	POTENTIAL FUNDING SOURCES
	Rebuild Skate Park: • Determine a location to rebuild a skate park • Install new skate park structures	Recreation Department & DPW	2022	Capital, City Budget, PARC Grant, CDBG, The Skatepark Project Grant
	Make needed improvements to Murphy Park • Install picnic tables, bleachers, and water fountain/ bottle station • Improve ADA Accessibility	Recreation Department & DPW	2023	Capital, City Budget, PARC Grant, CDBG, MLB-MLBPA Youth Development Foundation[59], MA ADA Improvement Grant Program
	Address the need for shade trees (and the resulting heat island effect, increasing cooling costs, and lack of shade for visitors) at the Jon Zon Community Center: • Removing the dead and dying flowering dogwood from the parking lot islands and planting shade trees that are salt tolerant; Plant shade trees in large grassy areas on the east and south of the property	Greenfield Tree Committee, Greening Greenfield, DPW, Department of Planning and Development, City Engineer, Senior Center Staff or members	2021-2028	City Budget, MVP Program

[59] Major League Baseball Youth Development Foundation

OBJECTIVE	ACTION[53]	RESPONSIBLE BOARD or GROUP	START DATE[54]	POTENTIAL FUNDING SOURCES
	• Create small cut-outs from the parking lot into the undersized tree belt on the west side to accommodate three to four shade trees among the small hedgerow. Doing so may require designating the spaces on along the west side of the parking lot for compact cars only • Develop a consistent tree watering plan for the first two years after planting			
	Expand Community Gardens • Conduct a short survey to determine most needed location(s) to build additional gardens • Focus on expanding gardens in Environmental Justice neighborhoods and places with high concentration of rental housing • Work with community garden users to determine interest in growing fruit trees, and plant appropriate species	Recreation Department, Department of Planning and Development, DPW, Tree Warden, Greenfield Tree Committee. Agricultural Commission, Greening Greenfield	2021-2028	City Budget, DCR Urban Forestry Challenge Grant, LWCF
	General Parks and Recreation Improvements • Study the potential for security lighting and/or cameras at all parks • Explore possible location and funding for a City Recreation Center • Assess trees at parks, and develop and implement a tree replacement plan (See A.6.)	Recreation Department, Department of Planning and Development, DPW, GTC, Greenfield Local Cultural Council, Cultural District Commission	2021-2028	City Budget, U.S. Forest Service Grant, PARC Grant, DCR Urban Forestry Challenge Grant, CDBG, LWCF,

OBJECTIVE	ACTION[53]	RESPONSIBLE BOARD or GROUP	START DATE[54]	POTENTIAL FUNDING SOURCES
	• Develop a public access point on the Green River for boaters • Enhance open space areas with public art • Explore options for the development of a pump track, disc golf course, and skating ribbon • Explore funds/availability for more trash receptacles and dog waste stations throughout parks • Develop park maintenance plan for long term care and upkeep • Install accessible surface to allow people using wheelchairs to access the High School track • Add wayfinding signage to trail heads and trail intersections. Signs should be durable and attractive, and note if trail is a walking trail or a biking trail. • Assess all trails as to usage and put up signage to indicate usage types (such as walking, biking, dogs are/not allowed, etc.) • Assess trails and parks for "carry-in carry-out" signage and add signage at appropriate trail heads or parks			GLCC[60], Mass Humanities, Mass Cultural Council, People for Bikes Community Grant

[60] Greenfield Local Cultural Council

OBJECTIVE	ACTION[53]	RESPONSIBLE BOARD or GROUP	START DATE[54]	POTENTIAL FUNDING SOURCES
	Develop the former Wedgewood Gardens site within the constraints of the floodplain regulations to include the following: • Continue to address needed riverbank stabilization issues • Develop and implement a Japanese knotweed eradication plan for the river corridor • Plant native tree and shrub species along the river corridor • Assess the possibility of siting a small deck for river viewing and/or fishing on this site • Implement the pollinator planting techniques developed in Greenfield's 2021 Pollinator Plan to plant the steep grassy slope on the east/northeast edge of the site • Ensure adequate space for residents to continue to use the site as a dog-walking area • Work with the relevant entities to identify an alternate overflow parking site for Green River Festival and Wormtown • Design and install interpretive signs that provide info on native and pollinator plants	Recreation Department, Department of Planning and Development, DPW, Greenfield Tree Committee, Conservation Commission	2021-2028	PARC Grant, MVP Program

OBJECTIVE	ACTION[53]	RESPONSIBLE BOARD or GROUP	START DATE[54]	POTENTIAL FUNDING SOURCES
	Increase volunteers working in Greenfield's urban green spaces and open spaces by: • Hiring a volunteer coordinator (possibly through the Terra Corps) to recruit and manage volunteers to help maintain Greenfield's public street trees, gardens, parks, and conservation areas, as well as to participate in annual clean-up, planting events and invasive plant species removal • Maintaining an online site to connect volunteer opportunities with existing resources and organizations	Greenfield Tree Committee, Greening Greenfield	2021-2028	Terra Corps, City Budget
A.2. Protect, preserve, and enhance, conservation areas	Work with local trail groups/clubs and the Department of Public Works on continuing trail maintenance and expansion of the existing trail system	Recreation Department & DPW, Greenfield Tree Committee	2021-2028	City Budget, Mass Trails Program
	Work to identify and acquire threatened environmentally sensitive areas using information available through Mass Wildlife's Natural Heritage & Endangered Species Program and Greenfield's BioMap2 Core Habitats and Natural Landscapes Report	Conservation Commission & Department of Planning and Development	2021-2028	CPA, LAND Grant[61], LWCF, Open Space Institute's Western Massachusetts

[61] Local Acquisitions for Natural Diversity Grant Program

OBJECTIVE	ACTION[53]	RESPONSIBLE BOARD or GROUP	START DATE[54]	POTENTIAL FUNDING SOURCES
				Land Protection Fund
	As needed, develop management plans for each parcel under conservation that prioritize pro-forestation to increase carbon storage	Conservation Commission & Department of Planning and Development	2021-2028	City Budget
	Work to ensure that recreation activities are consistent with the protection of plant, wildlife and fish populations and their habitats	Recreation Department & Conservation Commission	2021-2028	In-Kind
	Identify and protect parcels adjacent to conservation areas to reduce forest fragmentation	Conservation Commission & Department of Planning and Development	2021-2028	City Budget, Conservation Fund
	Work to identify and certify existing vernal pools with the MA NHESP/Division of Fisheries and Wildlife	Conservation Commission & Department of Planning and Development	2021-2028	City Budget, Conservation Fund
	Work to remove invasive trees and plant species. Specific actions may include: • Developing a tracking and prioritization of areas with invasive tree and plant species. • Focusing on areas where particular species, including Oriental bittersweet and Japanese knotweed, have overrun the native ecosystem, especially along the Green River • Developing management plans and conducting invasive tree and plant removal for areas such as Temple Woods and Highland Park, where	Conservation Commission, Tree Warden, Greenfield Tree Committee	2021-2028	City Budget, Conservation Fund, MassWildlife Habitat Management Grants

OBJECTIVE	ACTION[53]	RESPONSIBLE BOARD or GROUP	START DATE[54]	POTENTIAL FUNDING SOURCES
	Norway maple trees and exotic plant and shrub species are displacing native species			
	Work to acquire land in environmental justice areas to increase accessibility to open space opportunities within the City	Department of Planning and Development	2021-2028	City Budget, Conservation Fund, Grants, CPA[62]
	Acquire one or two vacant lots along Federal Street to convert into green spaces and to provide places for pedestrians to rest and beauty in a commercial area.	Department of Planning and Development, Rec Department, Greenfield Tree Committee	2021-2028	PARC Grant, DCR Urban Forestry Challenge Grant
A.3.Protect, and preserve agricultural lands, and support farmers and owners of agricultural lands	Provide free gatherings for willing farmers and other land owners to learn about the benefits of the Agricultural Preservation Restriction (APR) Program and other tools such as conservation and deed restrictions	Conservation Commission & Agricultural Commission, Local land trusts (MGLT, Hilltown Land Trust, Franklin Land Trust), Conservation Law Foundation, CISA	2021-2028	In-Kind, Volunteers
	Educate willing farmers about the effects of non-point source pollution from agricultural runoff, planting of buffer strips which can include pollinator habitat, and organic farming practices	Conservation Commission & Agricultural Commission, Connecticut River Conservancy, NOFA	2021-2028	In-Kind, Volunteers, Conservation Fund

[62] Community Preservation Act Funds

OBJECTIVE	ACTION[53]	RESPONSIBLE BOARD or GROUP	START DATE[54]	POTENTIAL FUNDING SOURCES
	Work with the City to promote the Chapter 61, 61A, and 61B programs. Provide educational materials to would-be farmers about the program.	Conservation Commission & Agricultural Commission	2021-2028	City Budget
	Advocate with state officials and other entities to institute a new Chapter 61 C, a program that would incentivize land owners to keep their forests intact (and not logged) to maximize carbon storage.	Greenfield Mayor, FRCOG Director, Land trusts, Department of Planning and Development	2021-2028	In-Kind
	Develop through local zoning, an agricultural overlay district in order to encourage the preservation of agricultural land	Conservation Commission, Agricultural Commission, & Department of Planning and Development	2021-2028	City Budget
	Encourage collaborations between advocacy groups and farmers, woodland owners and other landowners to help explain land conservation and land management options, including keeping forests intact to increase carbon storage.	Conservation Commission & Agricultural Commission, Land trusts, American Farmland Trust	2021-2028	In-Kind
	Provide educational opportunities for farmers to learn about farm succession planning and facilitate free legal services	American Farmland Trust, Land trusts, Conservation Law Foundation, CISA	2021-2028	Conservation Law Foundation Legal Food Hub
	Inventory all agricultural land – including active and fallow cropland, pastures, orchards, and its infrastructure – including housing - to assess and encourage its potential preservation	Conservation Commission & Agricultural Commission, Mount Grace Conservation Land Trust, FRCOG, CISA, Department	2021-2028	In-Kind

OBJECTIVE	ACTION[53]	RESPONSIBLE BOARD or GROUP	START DATE[54]	POTENTIAL FUNDING SOURCES
		of Planning and Development		
A.4. Protect the environment from the negative impacts of human development, encourage low impact development whenever possible	Work with the Connecticut River Conservancy, NOAA Restoration Center, American Rivers, and the U.S. Fish and Wildlife Service on dam improvements/removals on the Green River for fish passage.	Department of Planning and Development, DPW, & Conservation Commission	2021-2028	Massachusetts Environmental Trust Program
	Establish a practice of cooperation and communication between City departments during regular maintenance activities and when issues come up on City-owned properties to prevent impacts to natural resources	Conservation Commission, Department of Planning and Development, DPW, Recreation Department, Building Department, & Health Department	2021-2028	In-kind
	Encourage developers to establish pocket parks with new development projects, prioritizing reducing the fragmentation of existing forests.	Department of Planning and Development, Recreation Department, Building Department	2021-2028	In-kind
A.5. Preserve and protect heritage landscapes such as historic, archeological sites, and scenic resources.	Work to acquire important Heritage Landscapes as they become threatened by development	Department of Planning and Development, Conservation Commission, & Historical Commission, Local Cultural Council	2021-2028	CPA
A.6. Protect existing trees and plant additional trees along urban streets and	Utilize the 2020 Greenfield Tree Inventory Report to prioritize and guide tree-related decisions.	Greenfield Tree Warden, Greenfield DPW, Greenfield Tree Committee	2021-2028	U. S. Forest Service Tree Grant

OBJECTIVE	ACTION[53]	RESPONSIBLE BOARD or GROUP	START DATE[54]	POTENTIAL FUNDING SOURCES
on public lands, emphasizing native trees				
	Continue to update and improve the tree inventory by using iTree Canopy to measure the percent tree canopy cover in more developed areas of the City and set percent canopy goals. Conduct a canopy re-assessment every five years.	Greenfield Tree Committee	2021-2028	U. S. Forest Service Tree Grant
	Use iTree Canopy and other tools to set percent tree canopy cover goals for the more populated areas of the City, using the Sustainable Greenfield Master Plan goal of 40% in the interim.	Greenfield Tree Committee	2021-2028	U. S. Forest Service Tree Grant
	Continue systematic planting of primarily native trees in priority planting zones in the urban core	Greenfield Tree Warden, Greenfield DPW, Greenfield Tree Committee	2021-2028	U. S. Forest Service Tree Grant
	Develop a citizen tree steward program to increase the capacity to maintain and care for trees, including pruning, watering and mulching. Seek out groups looking for community service opportunities and train them to perform tree related volunteer tasks.	Greenfield Tree Committee	2021-2028	DCR Urban Forestry Grant, Community Foundation of Western Mass, TD Green Space Grant
	Conduct the following actions related to tree watering: • Investigate options for providing Greenfield Tree Committee with equipment needed to	Greenfield Tree Committee, Mayor, City Council	2021-2028	DCR Urban Forestry Grant, Community

OBJECTIVE	ACTION[53]	RESPONSIBLE BOARD or GROUP	START DATE[54]	POTENTIAL FUNDING SOURCES
	carry out watering of young trees in the urban core. • Increase staffing and capacity of the DPW's Forestry Division to provide season-long watering of new trees and to conduct preventative tree maintenance to avoid more costly tree maintenance or removal in the future.			Foundation of Western Mass, TD Green Space Grant, City Budget
	Continue to conduct Greenfield Tree Committee-led community-based tree plantings with neighborhood liaisons.	Greenfield Tree Committee, DCR Urban Foresters	2021-2028	DCR Urban Forestry Grant, Community Foundation of Western Mass, TD Green Space Grant
	Inventory trees on municipal/public properties in urban core and in all City parks and determine need for maintenance and planting. Plantings should focus on native trees.	Greenfield Tree Committee	2021-2028	DCR Urban Forestry Grant, Community Foundation of Western Mass, TD Green Space Grant
	When opportunities arise - such as during major road and sidewalk reconstruction, underground overhead	DPW, Department of Planning and Development	2021-2028	MassDOT Transportation

OBJECTIVE	ACTION[53]	RESPONSIBLE BOARD or GROUP	START DATE[54]	POTENTIAL FUNDING SOURCES
	utilities to improve their resilience to climate change to allow for the planting of more shade trees.			Enhancement Grants
A.7. Provide education via public spaces to increase support for the natural environment	Create murals and other public art that increases enthusiasm for and interest in trees, pollinators, and nature	Greenfield Tree Committee, Local Cultural Council	2021-2028	MA Cultural Council
	Host tree and nature walk and talks to increase the public's understanding and enthusiasm for trees and nature; partner with other groups with shared interests and connections to nature and the earth	Greenfield Tree Committee, Greening Greenfield, Greenfield Garden Club, Nolumbeka Project	2021-2028	Volunteers
	Work with schools to provide identification of trees, birds, plants, and pollinators on school property for the purposes of educating children	Greenfield Tree Committee, Greenfield Public Schools	2021-2028	Volunteers
	Promote Greening Greenfield's 70% pollinator plant challenge	Recreation Department, Greenfield Tree Committee	2021-2028	Volunteers
	Design creative signs or other methods of teaching the public about trees along Main Street	Greenfield Tree Committee, Downtown Greenfield business owners	2021-2028	Volunteers, In-Kind
	Create a platform where residents can tell stories about their favorite natural and open spaces in Greenfield	Greenfield Tree Committee, Local Cultural Council	2021-2028	Community Foundation of Western Mass

OBJECTIVE	ACTION[53]	RESPONSIBLE BOARD or GROUP	START DATE [54]	POTENTIAL FUNDING SOURCES
	Collaborate on public events that invite the public to learn about the GTC's tree nursery and related activities	Greenfield Tree Committee, Just Roots	2021-2028	Volunteers
A.8. Anticipate the continuing impacts of climate change on the urban forest	Seek climate change related education on: • the changing ranges of tree species and adjust tree species planted by the city and volunteer groups • invasive plant and insect species that are increasing due to climate change and are negatively impact native trees	Greenfield Tree Warden, Greenfield DPW, Greenfield Tree Committee	2021-2028	Volunteers
	Conduct trial plantings of trees typically growing south of our region to determine their suitability for street tree planting in Greenfield	Greenfield Tree Committee	2021-2028	Volunteers, DCR Urban Forestry Challenge Grant
	Continue to expand the growing capacity of the Greenfield Tree Committee's community tree nursery to provide low cost, native tree options that are resilient to climate change. Grow trees with species diversity in mind to avoid mass losses of trees due to insects or pathogens.	Greenfield Tree Committee	2021-2028	Volunteers, U. S Forest Service Tree Grant
A.9. Promote the protection of existing trees and planting of additional trees on	Increase awareness of the Greenfield Tree Committee and its resilient trees for residential planting selection tool using social media and local newspapers	Greenfield Tree Committee	2021-2028	GTC[63], Volunteers

[63] Greenfield Tree Committee

OBJECTIVE	ACTION[53]	RESPONSIBLE BOARD or GROUP	START DATE[54]	POTENTIAL FUNDING SOURCES
private lands, and increase knowledge about and enthusiasm for trees				
	Provide educational opportunities for private land owners to: • Learn about the benefits of trees including ecosystem services, wildlife and pollinator habitat and other benefits. • Learn tree care and planting skills • Learn about native trees and wildlife/pollinators	Greenfield Tree Committee, Greening Greenfield, DCR Urban Foresters	2021-2028	GTC, Volunteers
	Develop an "Ask the Expert" program to provide information to the public about trees, tree planting, and other such topics. The program could be featured events, fairs, and farmers markets.	Greenfield Tree Committee, Greening Greenfield, Greenfield Garden Club	2021-2028	GTC, Volunteers
	Develop tags that could be provided to local nurseries and other businesses selling trees and could include info and links to best practices for tree planting.	Greenfield Tree Committee	2021-2028	GTC, Volunteers
	Add a best practices page to GTC's website for tree planting and maintenance	Greenfield Tree Committee	2021-2028	GTC
Goal B. *INCREASE MUNICIPAL & PUBLIC AWARENESS, UNDERSTANDING AND ENJOYMENT OF GREENFIELD'S OPEN SPACE AND RECREATIONAL FACILITIES AND PROGRAMS*				

OBJECTIVE	ACTION[53]	RESPONSIBLE BOARD or GROUP	START DATE[54]	POTENTIAL FUNDING SOURCES
B.1. Improve and increase access for Greenfield residents to public open space and recreational facilities, and improve awareness of the facilities	Promote the programs and facilities of the Greenfield Recreation Department and organized/sport groups who use Greenfield's open space facilities	Recreation Department & Conservation Commission	2021-2028	City Budget
	Launch a campaign to inform residents and others about open space and recreational facilities and areas using printed and digital maps and pamphlets as well social media and other internet tools.	Recreation Department & Conservation Commission, OSRP Committee, Local Cultural Council, Greening Greenfield	2021-2028	City Budget, Conservation Fund
	Educate residents about the many benefits of having and maintaining open space, utilizing social media and other tools.	Recreation Department & Conservation Commission, Land trusts, Local naturalists	2021-2028	City Budget, Conservation Fund
	Organize educational walks as requested (by schools/City events) on Greenfield conservation land, especially the Griswold/GTD conservation area and Highland Park/Poets Seat	Recreation Department & Conservation Commission, Greenfield Tree Committee, local naturalists	2021-2028	City Budget, Conservation Fund
	Develop a self-guided nature walk at a City conservation parcel, similar to the self-guided forestry walk at Griswold	Recreation Department & Conservation Commission, Greenfield Tree Committee, Local naturalists	2021-2028	Conservation Fund

OBJECTIVE	ACTION[53]	RESPONSIBLE BOARD or GROUP	START DATE[54]	POTENTIAL FUNDING SOURCES
	Encourage more people to hike in the Griswold Conservation Area by creating a tree tour and add it to GTC website's Tree Tour page	Greenfield Tree Committee	2021-2028	GTC
	Complete the creation of the Highland Park Tree tour, including signage, and encourage in-person and virtual use through social media and other venues.	Greenfield Tree Committee, Tree Warden, Local naturalist	2021-2028	Greenfield Tree Committee
	Work with FRTA to establish additional bus routes to City owned parks and open space.	Recreation Department, FRTA	2021-2028	In Kind
B2. Provide and improve connections to open spaces and decrease the dependency on cars for access	Support/revitalize the Franklin County Regional Bike Committee and the Greenfield Bikeway Coalition as entities to advocate for bike-related programs and projects, such as a regional or local bike share program.	Recreation Department, DPW, Department of Planning and Development, Franklin County Regional Bike Committee, Greenfield Bikeway Coalition, FRCOG	2021-2028	In-Kind
	Develop the riverside Bikeway to extend from the Greenfield Bike Path to Green River Park	Recreation Department & DPW	2021-2028	City Budget, Capital, People for Bikes Community Grant
	Provide bike racks and other important site amenities such as pump and repair stations at open space areas	Recreation Department, Conservation Commission, & DPW	2021	City Budget, Capital, MassDOT grants

OBJECTIVE	ACTION[53]	RESPONSIBLE BOARD or GROUP	START DATE[54]	POTENTIAL FUNDING SOURCES
	Develop shared roadway signage for bicycle routes to open space sites both local and regional	Recreation Department, DPW, & Conservation Commission	2021-2028	City Budget/ Grants, MassDOT grants
	Install/repair sidewalks and/or crosswalks to recreation areas, prioritize those that are heavily used by pedestrians	DPW	2021-2028	Capital, Grants, Budgets
	Develop a City-wide bike lane system and/or implement projects from *Greenfield's Complete Streets Prioritization Plan* that focus on the addition of bike lanes	Recreation Department & DPW	2021-2028	People for Bikes Community Grant
	Increase the number of shade trees planted along primary walking and biking routes to schools and to downtown to improve walking and biking conditions	Greenfield Tree Committee, Greenfield Public Schools, FRCOG Transportation Planners	2021-2028	DCR Urban Forestry Challenge Grant
B3. Maximize accessibility to all open space and recreation facilities for current and future generations	Prioritize ADA accessibility improvements in projects at existing open space sites	Recreation Department, DPW, and Commission on Disability Access	2021-2028	MA ADA Improvement Grant Program
	Regularly communicate with interest groups addressing disability issues at open space sites and develop public/private partnerships to help increase accessibility.	Recreation Department, DPW, and Commission on Disability Access	2021-2028	In-Kind
B4. Establish a permanent Open Space and Recreation Committee to	Work with the Mayor's Office to create a permanent OSRP Committee that includes members of the public. The OSRP Committee will hold regular meetings and collaborate with local and regional groups such as the	Recreation Department, Conservation Commission, Department of Planning	2021	In-Kind

OBJECTIVE	ACTION[53]	RESPONSIBLE BOARD or GROUP	START DATE[54]	POTENTIAL FUNDING SOURCES
serve as a liaison to the Mayor's Office	DRWC, CRC, FRCOG, Open Space Committees from surrounding Towns, MassDOT, and the DCR.	and Development, City Council, & Mayor's Office		
	Integrate the goals of the Open Space Plan into City policies and plans and make policies consistent with these goals and establish a coordinated mechanism to review and make recommendations regarding City policies and projects that will involve or impact open space and recreation.	Recreation Department, Conservation Commission, Department of Planning and Development, City Council, & Mayor's Office, New OSRP Committee	2021-2028	In-Kind
	Develop conservation management plans for all major publicly owned open space sites. Prioritize forest preservation for carbon storage and climate resilience.	Conservation Commission, Recreation Department, DPW, & Department of Planning and Development	2021-2028	In-Kind
	Encourage and support "friends of" organizations for recreation, parks, and other open spaces	Recreation Department & Department of Planning and Development	2021-2028	In-Kind
	Conduct a process to map and prioritize City parcels for conservation, including important farmlands, recreational lands, woodlands, drinking water areas, and wildlife habitat.	Department of Planning and Development, Recreation Department, & Conservation Commission	2021-2028	City Budget
Goal C. *PRIORITIZE CLIMATE RESILIENCY IN OPEN SPACE AND RECREATIONAL STRATEGIES TO SUPPORT THE HEALTH OF THE CITY'S PEOPLE, NATURAL RESOURCES AND INFRASTRUCTURE*				

OBJECTIVE	ACTION[53]	RESPONSIBLE BOARD or GROUP	START DATE[54]	POTENTIAL FUNDING SOURCES
C1. Provide information to the public about how climate change continues to affect Greenfield's open spaces and recreational areas	Design and install informational signs or kiosks for heavily trafficked open space areas that highlight the impacts of climate change, such as those installed at Energy Park	Department of Planning and Development, Recreation Department, & Conservation Commission	2021-2028	City Budget
	Add information about climate change to the existing Tree Tour of Highland Park on the Greenfield Tree Committee's website	Greenfield Tree Committee	2021-2028	Volunteers
	Develop standard, agreed-upon language for how climate change is presented related to open space and recreation, including using the present tense to talk about climate change impacts.	Department of Planning and Development, Sustainable Greenfield Implementation Committee,	2021-2028	City budget
	Develop an interactive map to highlight where educational tours are located once signs are updated, share with all relevant municipal and community organizations for posting on their social media pages	Department of Planning and Development, Recreation Department, & Conservation Commission, Greenfield Tree Committee	2021-2028	Greenfield Tree Committee
	Investigate possibilities to raise funds for open space such as revolving funds, user fees, voluntary contributions, etc.	Recreation Department & Department of Planning and Development	2021-2028	In-Kind, CPA

OBJECTIVE	ACTION[53]	RESPONSIBLE BOARD or GROUP	START DATE[54]	POTENTIAL FUNDING SOURCES
C2. Use both public and private funding to protect, preserve and enhance open space	Form a CPA Committee to develop a priority project list and coordinate work with the Open Space Committee	Mayor's Office	2021	In-Kind
	Attend capital budget meetings in support of open space and recreation plan projects.	Recreation Department, DPW, Department of Planning and Development, City Council, Mayor's Office, Greenfield Tree Committee	2021-2028	In-Kind
	Evaluate parcels for their natural resource value using methods from MassAudubon's MAPPR program, The Nature Conservancy's Resilient Landscapes mapping, and FRCOG's Watershed-Based Plan for the Deerfield River Watershed. Adopt and apply criteria to identify and prioritize protection of land in Greenfield with high-conservation value, such as scenic ridges, farmland, rivers, drinking water, wildlife habitat, unfragmented forest, and upland watershed areas with climate resiliency benefits, such as flood storage.	Department of Planning and Development, Conservation Commission	2021-2028	MVP Program
C3. Consider ecological resilience and climate resilience when	Hire a consultant to prepare final designs and cost estimates for climate resiliency projects identified in the *Green River Corridor Mapping and Management*	Department of Planning and Development	2021-2028	MVP Program

OBJECTIVE	ACTION[53]	RESPONSIBLE BOARD or GROUP	START DATE[54]	POTENTIAL FUNDING SOURCES
developing open space protection strategies	*Report* (2019) and to expand River Corridor mapping to tributaries of the Green River.			
	Consider zoning changes to add a River Corridor Overlay District to ensure public safety and healthy watershed function along the Green River.	Department of Planning and Development	2021-2028	FRCOG Technical Assistance, MVP
	Incorporate relevant action items from Greenfield's completed *Municipal Vulnerability Preparedness Plan* (2021) to the work of the Open Space and Recreation Committee.	Department of Planning and Development, Open Space Committee	2021-2028	MVP Program
	Connect existing green spaces and develop interconnected additional greenways and green spaces that correspond to the natural migration patterns of plant and animal species	Department of Planning and Development, Conservation Commission	2021-2028	MVP Program, CPA
C.4. Combat climate change by increasing the long-term carbon storage of City-owned conservation areas and urban forests by maintaining or increasing forest cover	Investigate options for alternative sources of revenue for City-owned properties that are typically logged. Consider enrolling conservation lands into a carbon trust, similar to the Tri-City carbon project. www.cooleffect.org/content/project/tri-city-forest-project	Conservation Commission, Department of Planning and Development	2021-2028	In-kind
	Increase public education about the value of intact forests as important resources for carbon storage, and provide information on carbon trusts to private land owners.	Conservation Commission, Department of Planning and Development	2021-2028	In-kind, volunteers

OBJECTIVE	ACTION[53]	RESPONSIBLE BOARD or GROUP	START DATE[54]	POTENTIAL FUNDING SOURCES
C5. Prepare for increasingly heavy rain events, causing more stormwater to enter streams and rivers	Conduct an analysis of impervious surfaces, slopes, and stormwater drains to determine where the heaviest flows of stormwater enter storm drains, streams and rivers. Determine areas where mass plantings of trees could capture and infiltrate rainfall.	Department of Planning and Development, DPW, Greenfield Tree Committee	2021-2028	MVP Program
GOAL D: *DEVELOP, IMPROVE AND PROMOTE OPEN SPACE CONNECTIONS*				
D1. Re-establish wildlife migration corridors	Develop interconnected greenways that correspond to the natural migration patterns of animal species and identify parcels of land that could be conserved to support these patterns. Review and amend the City's zoning bylaws as necessary to ensure impacts to wildlife migrations are considered.	Department of Planning and Development, Conservation Commission	2021-2028	CPA, City Budget
	Develop an invasive species eradication plan for the Green River corridor and reintroduce and establish native plant and tree species	Connecticut River Conservancy, Greenfield Tree Committee Department of Planning and Development	2021-2028	MassWildlife Habitat Management Grant
	Work with the Deerfield River Watershed Association and Connecticut River Conservancy to identify key parcels for conservation projects that would promote connectivity throughout the watershed	Recreation Department, Department of Planning and Development & Conservation Commission	2021-2028	CPA
D2. Promote the creation of pollinator corridors	Incorporate relevant actions from Greenfield's completed *Pollinator Action Plan*, such as: • Developing support for pollinator habitat demonstration gardens at the Greenfield Public	Department of Planning and Development, Planning Board, Greening	2021-2028	MVP Program, CPA In-Kind

OBJECTIVE	ACTION[53]	RESPONSIBLE BOARD or GROUP	START DATE[54]	POTENTIAL FUNDING SOURCES
	Schools, Greenfield Public Library, and key City-owned open spaces. • Assessing potential for planting projects on City-owned properties and Right Of Ways. • Developing and distribute a brochure on incorporating pollinator habitat into the yards and public spaces of businesses. • Reviewing and updating the City's zoning bylaws to include pollinator friendly language	Greenfield, Greenfield Tree Committee		
	Coordinate with the Greenfield Tree Committee to ensure pollinator friendly tree plantings throughout the City	Greenfield Tree Committee	2021-2028	In-Kind
D.4 Promote the creation of "green space" along public ways	Work with the Mass Highway Department and the Greenfield Department of Public Works on the planting of native plants and shrubs along the roadways	Department of Planning and Development, Conservation Commission, DPW	2021-2028	City Budget
	Support the planting and beautification efforts of the Greenfield Garden Club	Recreation Department and Department of Planning and Development	2021-2028	In-Kind

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Expand Community Gardens in Greenfield by focusing on Environmental Justice neighborhoods and places with high concentrations of rental housing. Additionally, work with community garden users to determine interest in growing fruit trees and plant appropriate species.

LEYDEN

BERNARDSTON

Work with the Mayor's Office to create a permanent OSRP Committee that includes members of the public.

Continue to expand the growing capacity of the Greenfield Tree Committee's community tree nursery to provide low cost, native tree options that are resilient to climate change.

Consider zoning changes to add a River Corridor Overlay District to ensure public safety and a healthy watershed function along the Green River.

Make needed improvements to the Municipal Swimming and Recreation Area, such as stabilizing riverbank erosion of the west side of the river, planting native trees to increase tree canopy and shade in the area, installing a second Pavilion Shelter and upgrading the bridge.

GILL

SHELBURNE

Make needed improvements to Hillside Park such as installing a shade structure for the splash pad, constructing a walking path, researching options for a permanent public restroom facility, and planting shade trees along the park perimeter

Make needed improvements to Poet Seat/Rocky Mountain Ridge, such as investigating opportunities to improve pedestrian safety and pedestrian access to Poet's Seat and Sachem's Head from Maple Street to Rocky Mountain Road and improving connections to other open spaces/hiking trails.

Complete the creation of the Highland Park Tree Tour, including signage, and encourage in-person and virtual use through social media and other venues. Additionally, update trail maps, maintain the trail system, improve ADA accessibility, and install picnic tables and benches.

MONTAGUE

Develop the Riverside Bikeway to extend from the Greenfield Bike Path to Green River Park.

Develop a City-wide bike lane system and/or implement projects from Greenfield's Complete Streets Prioritization Pan that focus on the addition of bike lanes.

Develop the former Wedgewood Gardens site within the constraints of the floodplain regulations. Improvements to be considered include: addressing riverbank stabilization issues, siting a small deck for river viewing or fishing, implementing the pollinator planting techniques developed in Greenfield's 2021 Pollinator Plan to plant the street grassy slope on the east/ northeast edge of the site

General Parks and Recreation Improvements include: studying the potential for security lighting and/or cameras at all parks, seeking funding for a City Recreation Center, building a new Skate Park, assessing trees at parks and developing a replacement plan, obtaining funds for more trash receptacles and dog waste stations throughout parks, and enhancing open space areas with public art.

City of Greenfield
Franklin County Ma.

Permanently Protected Open Space
Building Footprint
Major Road
Local Road
River, Stream
Water Body

Sources: Map produced by the Franklin Regional Council of Governments Planning Department. GIS data sources include MassDOT, MassGIS and FRCOG. Depicted boundaries are approximate and are intended for planning purposes only, not to be used for survey.

City of Greenfield Open Space & Recreation Plan 2021

Action Plan Map

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SECTION 10

PUBLIC COMMENT

Public feedback, sought throughout the entire open space and recreation planning process, is difficult to document due to the fact that the draft plans constantly incorporated these changes and enhancements. A more direct request for feedback was presented in the public forum, which will be held on April 20th, 2021 via Zoom. Comments received during the public forum and the public comment period will be incorporated into the Plan.

Copies of the final version of the Greenfield Open Space and Recreation Plan were sent to the Massachusetts Division of Conservation Services (DCS), the Greenfield Mayor's Office, Recreation Department, Planning Board, and the Conservation Commission. Comment letters are inserted into the plan at the end of this section.

This section will be updated with feedback received during the Public Forum, and any comments received in writing will be attached to the plan.

SECTION 11

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